TIME LIFE BOOKS

THE ART OF WOODWORKING

WOOD CARVING

WORKSHOP GUIDE

A SAMPLE OLD ENGLISH ALPHABET FOR INCISED CARVING

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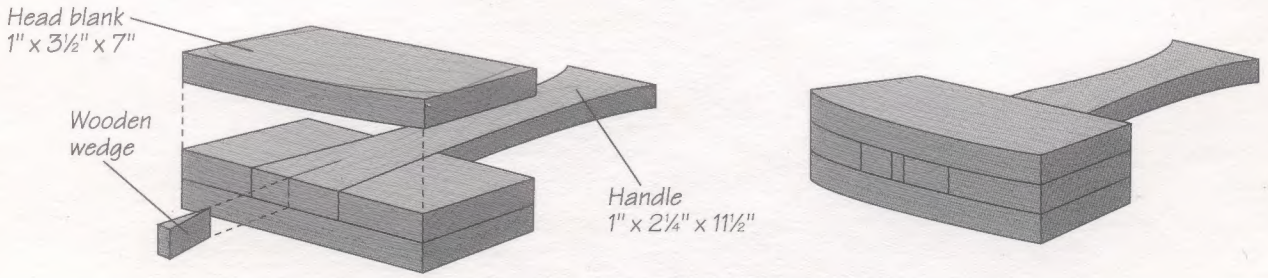
MAKING A WOOD MALLET

A WOODEN MALLET

Shop-building your own wooden mallet from laminated pieces of hardwood is an inexpensive way to stock your shop with a selection of these useful, durable tools. Although the illustration includes suggested dimensions, you can size the mallet to suit your needs.

Cut the three head blanks and the handle from a wood like oak or maple. To fashion the handle, taper the sides slightly from both ends to the middle on the band saw. Then saw a kerf into one end of the handle. Copy the handle's shape onto the middle head blank and saw it out. Then glue up the mallet, alternating the grain direction of the head pieces to provide the maximum strength.

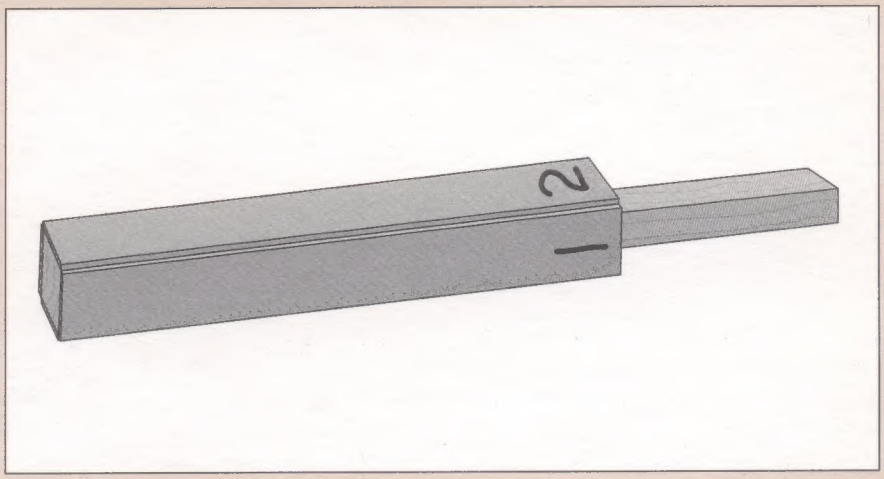
Allow the glue to dry overnight; once it has cured, insert a shop-made wooden wedge in the kerf and tap it in place, then shape the head to your liking on the band saw. Mallet heads are typically rounded on the top with slight angles on each face to ensure square striking. Chamfer the edges of the head to prevent it from splitting and cut a bevel along the edges of the handle for a comfortable grip.



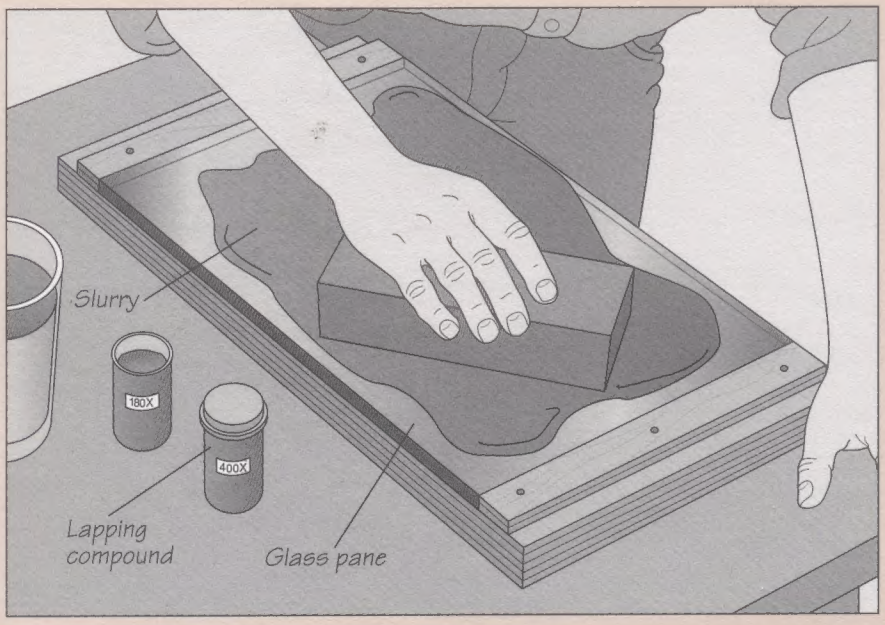
WORKSHOP GUIDE

MAKING A COMBINATION STROP

Nothing puts a mirror finish and razor-sharp edge on carving tools like an old-fashioned strop. A combination strop like the one shown at right allows you to work up to a high polish with several grades of buffing compounds. To make the strop, simply cut a piece of 2-inch-square hardwood stock about 12 inches long and glue a handle to one end. Glue strips of scrap leather to each of the four sides; harness leather works best, although an old belt will do the trick. The first three sides can be charged with coarse to fine buffing compounds; for final polishing, the last side is used without any compound.



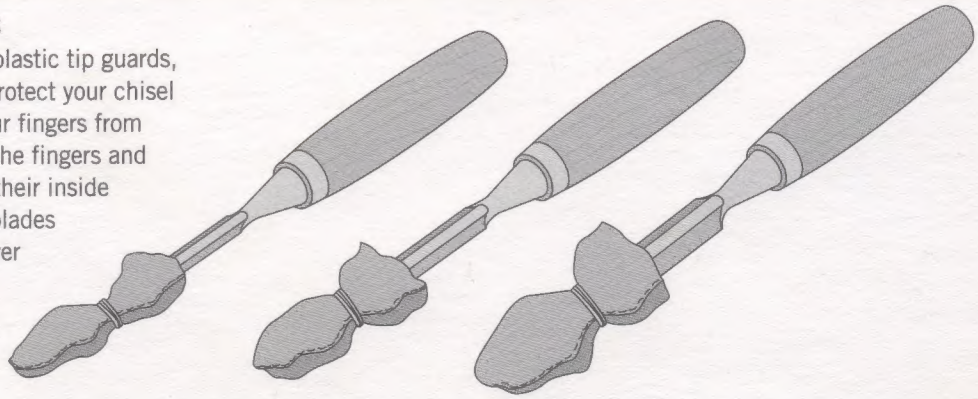
TRUING A BENCHSTONE



All benchstones will develop a hollow in the center after prolonged use. To true a benchstone, flatten it on a machined surface, such as glass pane or a commerical lapping table. For oilstones, rub the surface with a circular motion *(left)* in a stone over the slurry made from a coarse lapping compound mixed with honing oil. Start with a coarse grit and work through finer grits until the stone is flat. To true a waterstone, use water instead of honing oil for the slurry, or wet/dry silicon carbide paper taped to the lapping surface.

PROTECTING CHISEL BLADES

If you find yourself short of plastic tip guards, use an old leather glove to protect your chisel blades from damage and your fingers from stray cutting edges. Cut off the fingers and wipe a little machine oil on their inside surfaces to keep the chisel blades from rusting. Slip a finger over each blade and secure the leather sheaths in place with elastic bands.



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TIME-LIFE BOOKS
ALEXANDRIA, VIRGINIA

ST. REMY PRESS
MONTREAL

THE ART OF WOODWORKING was produced by
ST. REMY PRESS

PUBLISHER Kenneth Winchester
PRESIDENT Pierre Léveillé

Series Editor Pierre Home-Douglas
Series Art Director Francine Lemieux
Editor Andrew Jones
Art Directors Jean-Pierre Bourgeois, Normand Boudreau
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THE CONSULTANTS

Wayne Barton studied chip carving under Swiss master carvers in Brienz, Switzerland, and is the author of three books on the subject. He runs the The Alpine School of Woodcarving in Park Ridge, Illinois, and teaches throughout North America and Switzerland.

Ronald Rondeau is a master carver whose sculptures have won him over 100 first-place prizes in carving competitions across North America. He is a regular contributor to carving journals *Chip Chats* and *The Mallet*, and runs L'Atelier-Ecole Rondo in Beauport, Quebec.

Wood Carving.
p. cm. — (The Art of woodworking)
Includes index.
ISBN 0-8094-9544-9
1. Wood-carving—Technique. 2. Woodworking tools.
I. Time-Life Books. II. Series.
TT199.7.W66 1996
736'.4—dc20 95-36317
CIP

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First printing. Printed in U.S.A.
Published simultaneously in Canada.

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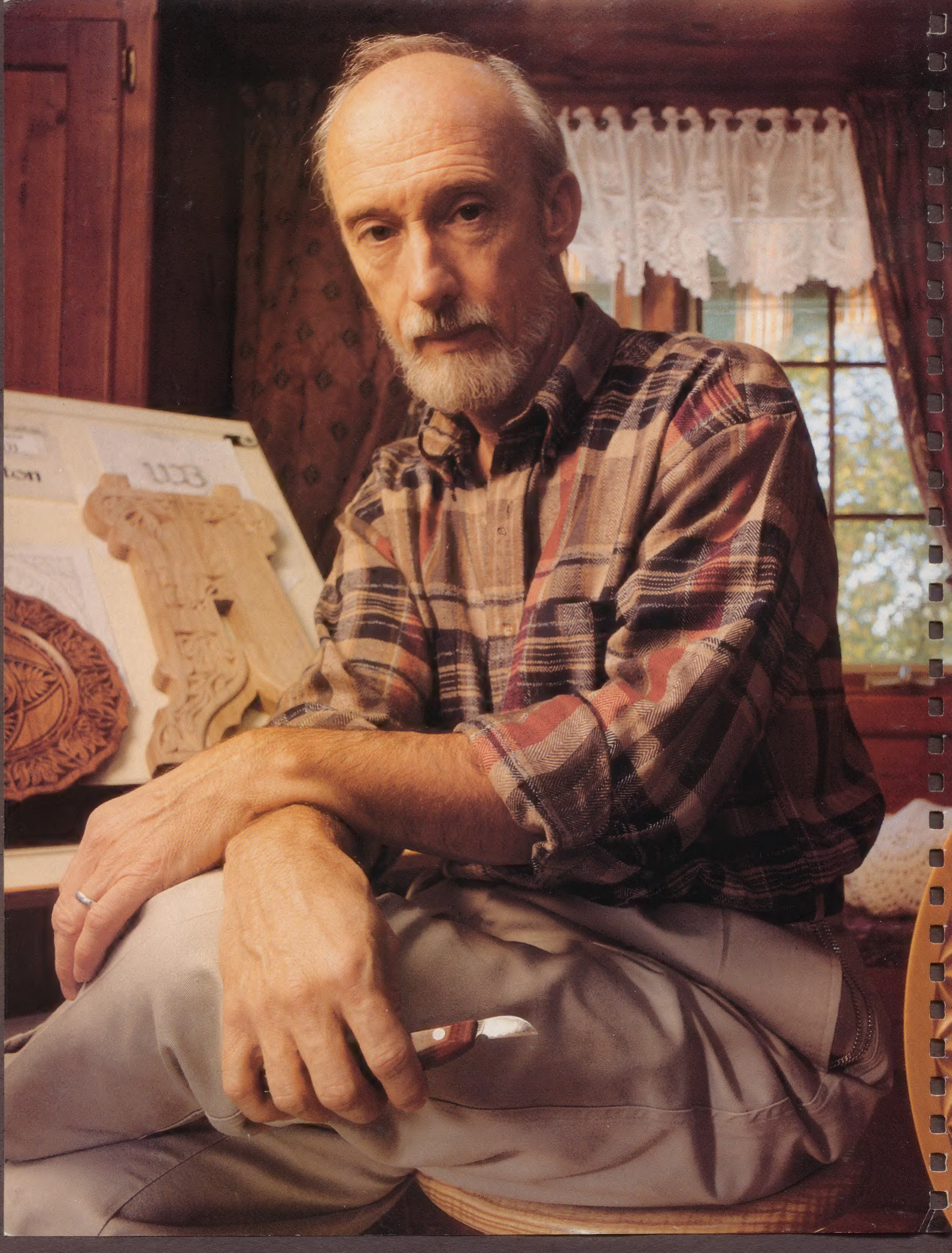


Wayne Barton on CHIP CARVING

As a small child I was fascinated with every aspect of wood: its feel, its smell, and the ever-changing beauty of its grain. From as far back as I can recall, my father supplemented the family income by pursuing his passion of furniture refinishing and antique restoration. And, from the age of five, under the watchful eye of my Norwegian grandfather who lived with us, I was tutored in carving wood. Thus began a wandering journey that would bring a lifetime of joy, excitement, challenges, and friendships.

Working with wood, from topping trees to boatbuilding, was an activity I continued into adulthood and the one that gave me my greatest pleasure. So when the opportunity to study in the woodcarving center of Brienz, Switzerland, presented itself, I thought the world had stopped to let me on. This was the chance of a lifetime.

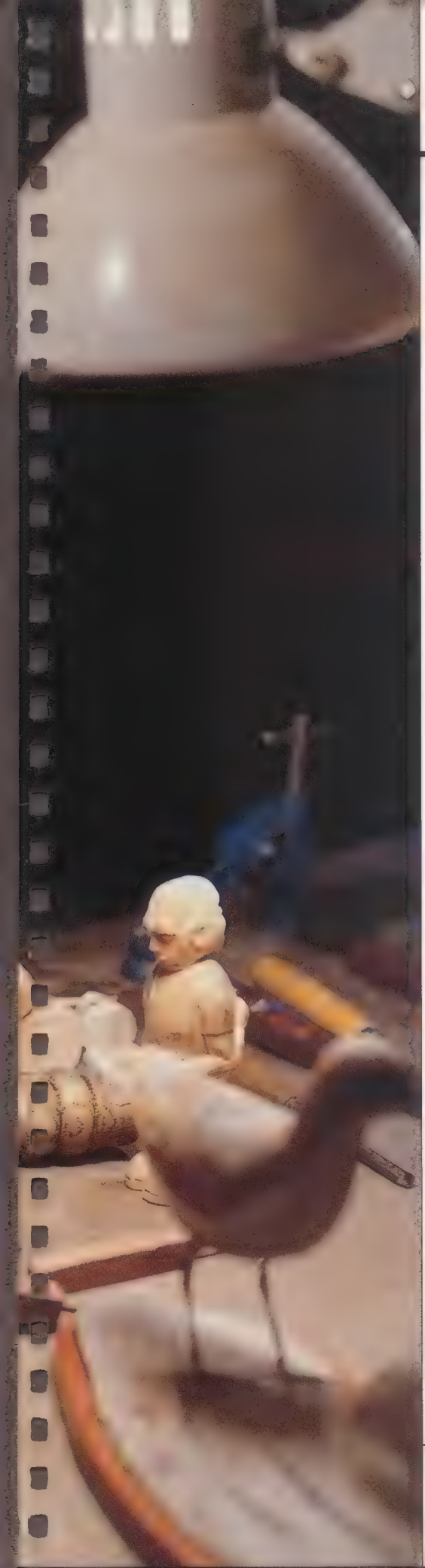
The experience of carving in the midst of masters whose skills were rooted in centuries of knowledge and tradition proved exhilarating. Learning carving from these craftsmen included acquiring discipline and an appreciation of art and architecture, particularly Gothic styles, upon which much of chip carving is based. I had the added good fortune of studying close to ancient castles and cathedrals, where I could observe firsthand design concepts and theory put into practice.

I was easily drawn to a Swiss method of chip carving primarily because it seemed to represent the essence of simplicity. Though this style was relatively unknown in North America at that time, I realized that with only two knives and a basic understanding of technique anyone could, in a relatively short period of time, produce amazingly satisfactory work.

The fact that chip carving in Europe sprang from the peasantry's effort to create beauty in their lives appeals to me. It also confirms my belief that man has a deep-seated desire to express himself artistically. Chip carving, a simple but decorative form of carving, fulfills this need very nicely. Everything from chairs, tables, and cupboards to plates, pepper mills, and pendants can be quickly and beautifully transformed with chip carving.

Perhaps my enthusiasm for chip carving has been the spark that ignited similar fires in so many others I've had the pleasure of teaching throughout the years. If it is true that we teach that which we love to learn the most, then carving, particularly chip carving, has been the most perfect vocation for me.

Wayne Barton is the founder of The Alpine School of Woodcarving, and author of several books on chip carving published by Sterling Press, including New And Traditional Styles of Chip Carving. *He lives in Park Ridge, Illinois.*



Ted Kona carves

A CHARLES II BELLOWS

From the time man discovered that he could fashion something from wood other than a spear or a truncheon, he has been hard at work carving, both as a trade and an avocation. Today, wood carving is in a state of flux. Even the keen amateur working in his hobby shop appears to be moving away from the use of gouges and sweeps toward small hand-held motor tools that seem to disintegrate wood very efficiently in any grain direction. On the workbench and shop floor, wood chips and shavings are being replaced with very fine sawdust.

So let us throw out the anchor right now and carefully mix ingredients from old carving techniques with newer recipes to create a type of carving that should last at least a century or more, enjoying the labors as we proceed. The fireplace bellows shown at left is a perfect example of this combination. A bandsaw, drill press, router, lathe, and sanding equipment will quickly execute the foundation work. Then comes carving the design into the face of the bellows. This is the fun part—the jelly in the donut.

The bellows can be made from maple, cherry, walnut, or oak. However, since this is a Charles II-period design, it only seems appropriate to use the white oak that was widespread in the British Isles in the 17th Century. The pattern shown was glued onto the front board blank with rubber cement, and a colored felt-tip pen was used to delineate the background areas. With my drill press pulley belt system arranged for its highest chuck speed and a small two-fluted ball mill adjusted to take off 3/16 to 13/64 of an inch, the colored background area was quickly removed.

This is where the real enjoyment began. Using a variety of flat and skewed gouges, the entire background area was worked over. Next, I formed the raised, rounded relief areas, carefully cutting with the grain, leaving attractive shiny areas in the wake of the work. A fine-pointed knife and a metal dental pick cleaned up slivers of wood in the corners.

The front and back boards were routed around their respective edges to accept the leather flap valve; three or four tacks held the 1/8-inch leather in place. A piece of leather was also tacked at the hinge point of the front board in a slot. Then I drilled a one-inch-diameter hole in the nose end of the combined front and back boards, before gluing the nozzle—which was turned on a lathe—in place. After a light sanding, I stained the wood, and 24 hours later applied a coat of Watco natural satin wax. The result was a durable finish—and an eye-catching, functional bellows that should be helping to light fires for a long time to come.

Ted Kona is a former mechanical engineer who taught woodworking to Boy Scouts for 50 years. He is currently a member of the National Wood Carvers Association and a regular columnist for Chip Chats *magazine. Kona lives in Beverly Hills, Michigan.*

Tommy Joseph on

TRADITIONAL TLINGIT CARVING

My mother was often upset at my fascination with knives. Like many young boys, I was constantly reminded of the danger of playing with them. But to me, the serrated steak knife that I snuck out of the drawer as an eight-year old was simply a tool to be used for carving wooden blocks into the Tlingit Northwest Coast forms that had begun to intrigue me.

My earliest recollection of exposure to wood carving is of a demonstration given in elementary school. My first project, as a result of that demonstration, was a simple wooden halibut hook. That hook started me on a search through museums and bookstores, collecting information on traditional Northwest Coast art forms. That same year, I began making bentwood boxes in the traditional manner of my people: Cedar planks are left to steam all day in an open pit over a fire buried with layers of spruce branches, skunk cabbage leaves, and seaweed. The cedar planks are then pliable and can be bent to form a four-sided box with only one seam.

Wood carving classes were not simple to find in most small Alaskan communities 23 years ago, so for the most part I practiced the skills on my own, acquainting myself with form and design. I used money from my paper route to purchase a piece of yellow cedar from which I carved a canoe paddle. In the early 1980s I was fortunate to be hired by the Ketchikan Totem Heritage Center as a tour guide and demonstrator. The opportunity at the Center to study and practice carving, and to learn the Tlingit culture gave me insight into the art form, its meaning, and message.

In the case of the 20-foot totem pole I am working on in the picture in the foreground, I first drew the plans of the totem on paper and then carved a small wooden model. The figures on the model were then measured and sketched to scale onto the pole, working from the bottom up. Each figure was roughed out and finished before moving to the next highest one, using many different kinds of adzes, such as straight adzes, gutter adzes, and lipped adzes. I painted each figure as I move up the pole.

The steps taken to learn my craft have been many, starting with years of practice devoted to the study of design, drawing, painting and most importantly, the capability to shape these designs into a piece of raw cedar. The finished product, whether it be a totem pole, a bentwood box, a ceremonial mask or a bowl must convey the past, present, and future of the Tlingit people.

A member of the Tlingit tribe, Tommy Joseph is a carving instructor at the Southeast Alaska Indian Cultural Center in Sitka, Alaska.

CARVING TOOLS

The tools of the carving trade, laid out in their entirety, may at first seem overwhelming to the novice, for the variety and choice is immense. However—and fortunately for the beginner—few tools are needed to start carving. Even professional wood carvers, with hundreds of tools at their disposal, perform the majority of their work with a dozen or so tools. The three fundamental types of carving tool are the chisel, which has a straight blade; the gouge, which has a curved blade; and the knife. Additional tools that are frequently used include draw knives and scorps, which are essentially curved drawknives that greatly ease the creation of concave forms.

Chisels are either flat, skewed, or veiners. The flat chisel is immediately recognizable. Its simple flat cutting edge is a must in any toolbox. The skew chisel has a blade angled to the right or the left for cleaning out corners. Veiners create a deep, round cut, and V-tools form angled grooves.

Gouges scoop out concave surfaces, but also can be used to shape convex forms. Making grooves should be left to V-tools, rather than attempting this with small gouges.

Wooden mallets are classic elements of the carver's tool box. The flat-faced carpenter's mallet (above, left) *has its face angled relative to the handle, making it easier to control. The cylindrical carver's mallet* (above, right) *will not slip, since it strikes on one narrow spot only, due to its oval face.*

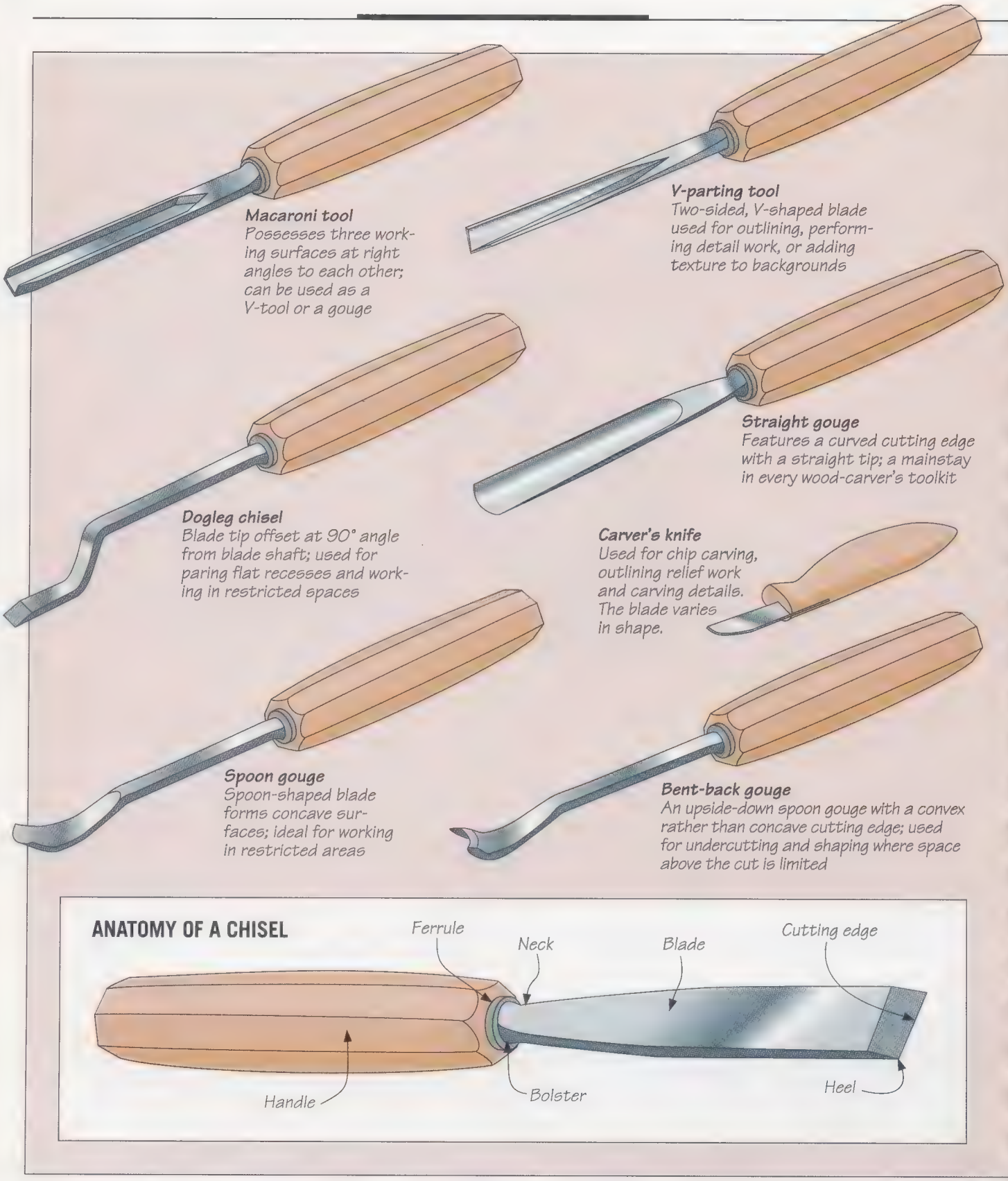
Knives are useful in all carving work. A relatively short-bladed knife is the main tool for chip carving. In other types of carving, a knife can become an effective surrogate for many tools. A sharp pocket knife is a perfectly acceptable carving tool, although it will lack the precision of more specialized tools. The basic tools of the carving trade are shown starting on page 14.

In addition to the chisels, gouges, and knives, you will also need some accessories to get you started. These range from files, rasps, planes, and mallets, to clamps to secure the workpiece in place.

Of course, a cutting tool is only as good as its edge, and sharpening is as important to carving as the tool itself. There are many sharpening techniques and tools, and much disagreement over the best among the experts. As with most aspects of woodworking, there is no one right way to do the job; the goal is the same no matter what the technique—a razor-sharp cutting edge. A detailed discussion of how to sharpen carving tools begins on page 22. Study this section thoroughly. Your enjoyment of the craft will depend upon it.

As you begin grinding the cutting edge of a carving tool, a thin line of reflected light will appear at the tip of the blade. Once the reflection disappears—as it almost has in the photo at left—you have sharpened the bevel to the edge, and should remove the gouge from the grinder.

A COLLECTION OF CARVING TOOLS



Macaroni tool
Possesses three working surfaces at right angles to each other; can be used as a V-tool or a gouge

V-parting tool
Two-sided, V-shaped blade used for outlining, performing detail work, or adding texture to backgrounds

Straight gouge
Features a curved cutting edge with a straight tip; a mainstay in every wood-carver's toolkit

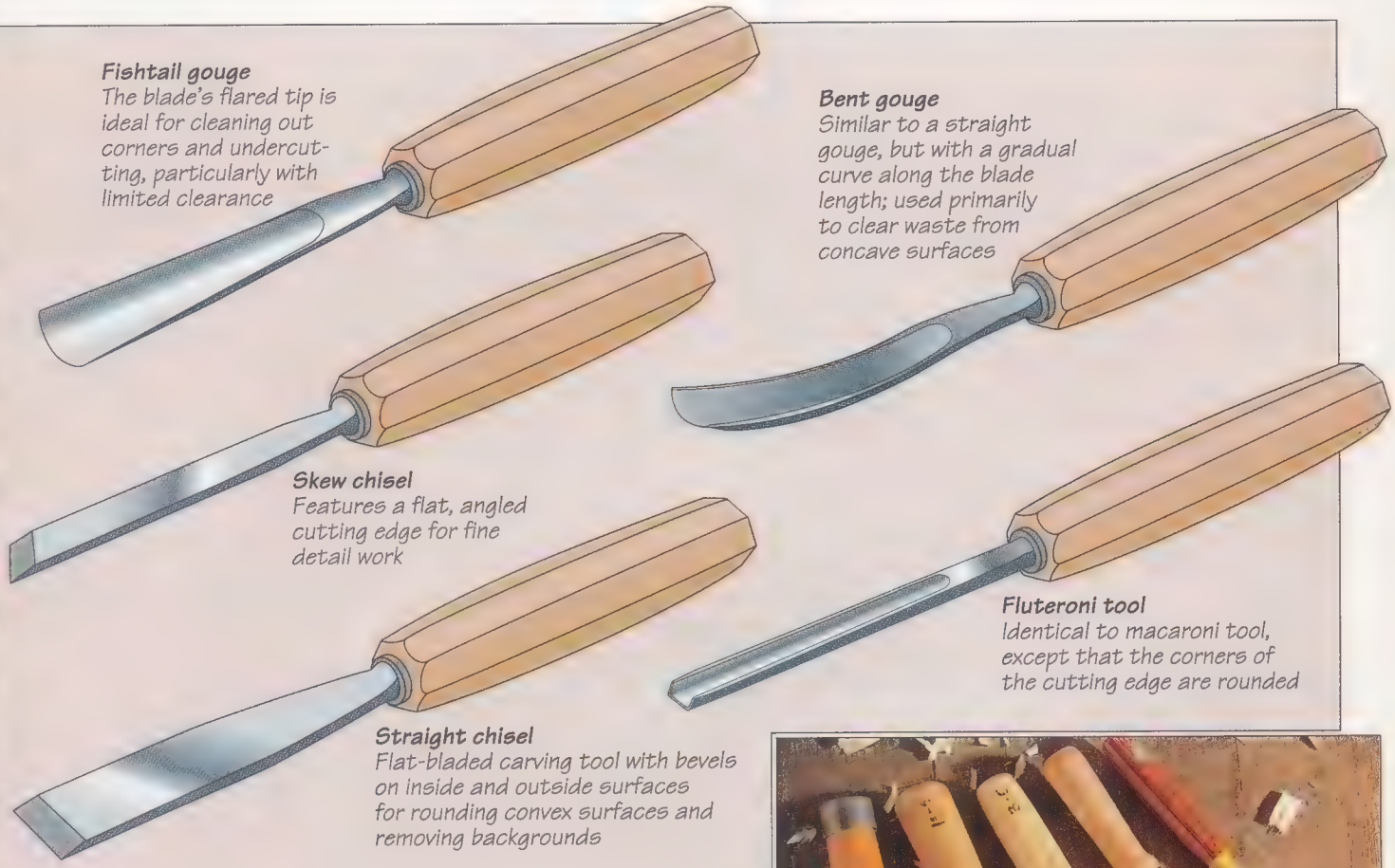
Dogleg chisel
Blade tip offset at 90° angle from blade shaft; used for paring flat recesses and working in restricted spaces

Carver's knife
Used for chip carving, outlining relief work and carving details. The blade varies in shape.

Spoon gouge
Spoon-shaped blade forms concave surfaces; ideal for working in restricted areas

Bent-back gouge
An upside-down spoon gouge with a convex rather than concave cutting edge; used for undercutting and shaping where space above the cut is limited

ANATOMY OF A CHISEL



Fishtail gouge
The blade's flared tip is ideal for cleaning out corners and undercutting, particularly with limited clearance

Bent gouge
Similar to a straight gouge, but with a gradual curve along the blade length; used primarily to clear waste from concave surfaces

Skew chisel
Features a flat, angled cutting edge for fine detail work

Fluteroni tool
Identical to macaroni tool, except that the corners of the cutting edge are rounded

Straight chisel
Flat-bladed carving tool with bevels on inside and outside surfaces for rounding convex surfaces and removing backgrounds

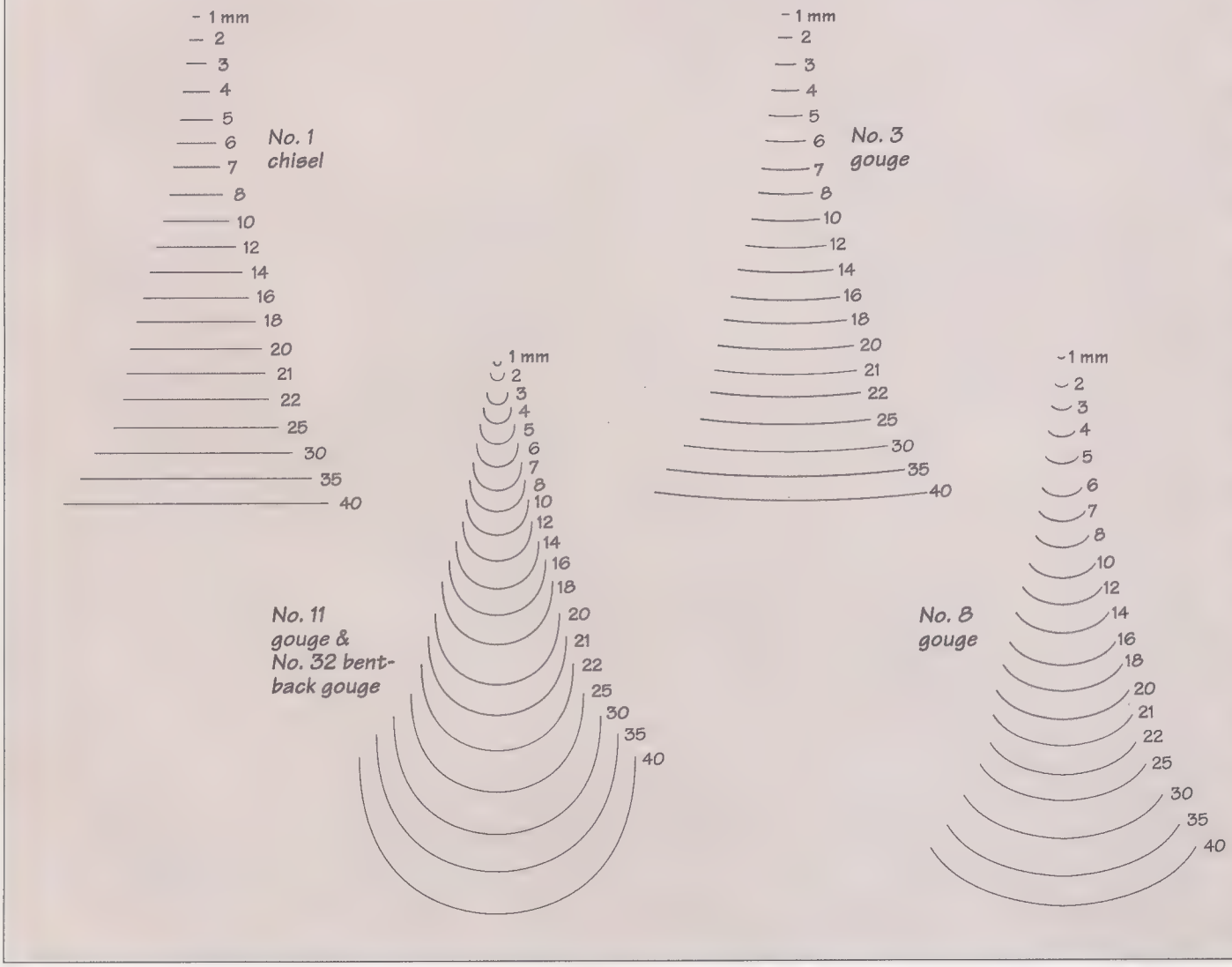
Tool roll
Made from leather or heavy-duty canvas with pockets for storing carving tools; handles are inserted into slots so that blades protrude

Different handles often reflect the origin of a chisel. The Swiss gouge, shown on the left, features a large, bulbous-shaped handle. The conical-shaped handle (second from left) *is typical of French-made chisels. Octagonal handles* (center) *are commonly used by German toolmakers. The two chisels on the right have turned handles—a favorite shape of English carving tools.*

CARVING TOOL SWEEPS AND SIZES

Carving tools are divided into three groups: Chisels, gouges, and V-parting tools. In each group, tools are distinguished by the shape of the blade (straight, spoon, V-parting, and so on); by the width of the cutting edge (2 mm to 35 mm); and by the degree of curvature, or sweep, of the blade (No. 1 to 40). The number increases with the degree of blade sweep. Straight, dogleg, and skew chisels all have flat cutting edges and so are assigned No. 1. V-tools are assigned a number according to the angle, ranging from 45° to 90°. Straight, spoon, bent, and fishtail gouges share the same range of sweeps. Specialty tools like bent-back gouges and macaroni tools carry their own numbers. A good basic set of chisels includes flat chisels, gouges, and V-tools as well as a carving knife. More advanced carvers would add bent-back gouges and other special types, as well as additional sizes of the standard types. Ultimately, the specific size and shape of a given chisel makes it the best tool for a given job. As a result, most professional carvers own a complete set of chisels in all sizes. They may also include cutting tools such as adzes and spokeshaves for large pieces, such as life-size figures. Some carvers even include tiny surgical tools in their collection for extremely small pieces.

CARVING TOOLS: SWEEPS AND SIZES (SHOWN FULL SIZE)



BASIC CARVING TOOL KITS

Beginner

- Chisels: No. 2—6 mm and 12 mm
- Gouges: No. 3—6 mm, 12 mm, and 25 mm; No. 8—25 mm; No. 11—4 mm, 6 mm, and 12 mm
- V-tools: No. 39—4 mm, 6 mm, and 12 mm

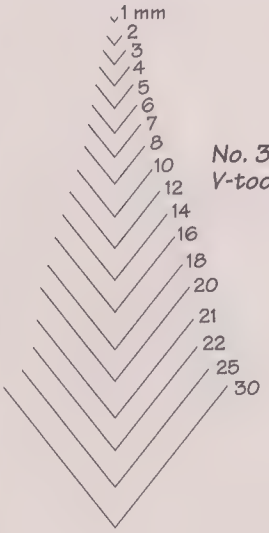
Advanced

(In addition to the beginner's set)

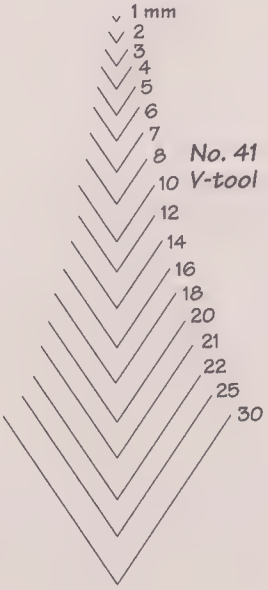
- Gouges: No. 3—35 mm; No. 11—2 mm; No. 16—35 mm; No. 32—8 mm
- V-tools: No 42—16 mm; No. 43—6 mm

Chip carving

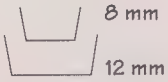
- Chip carving requires a cutting knife, which does most of the work, and a stabbing knife, which is intended specifically for embellishing chip carvings.



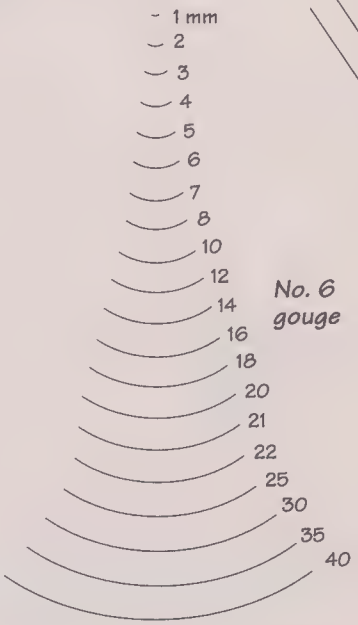
No. 39 V-tool



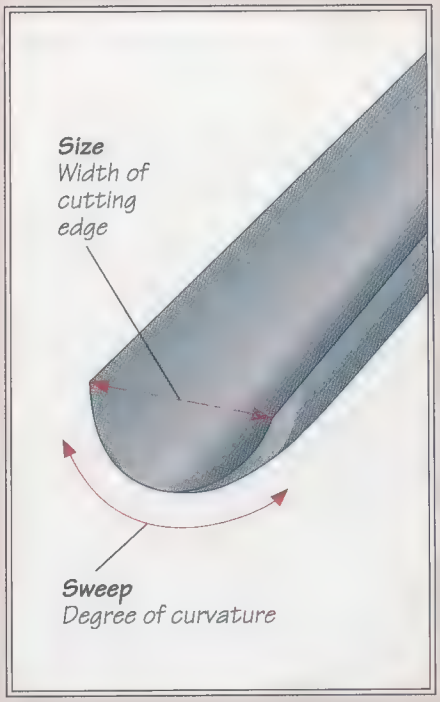
No. 41 V-tool



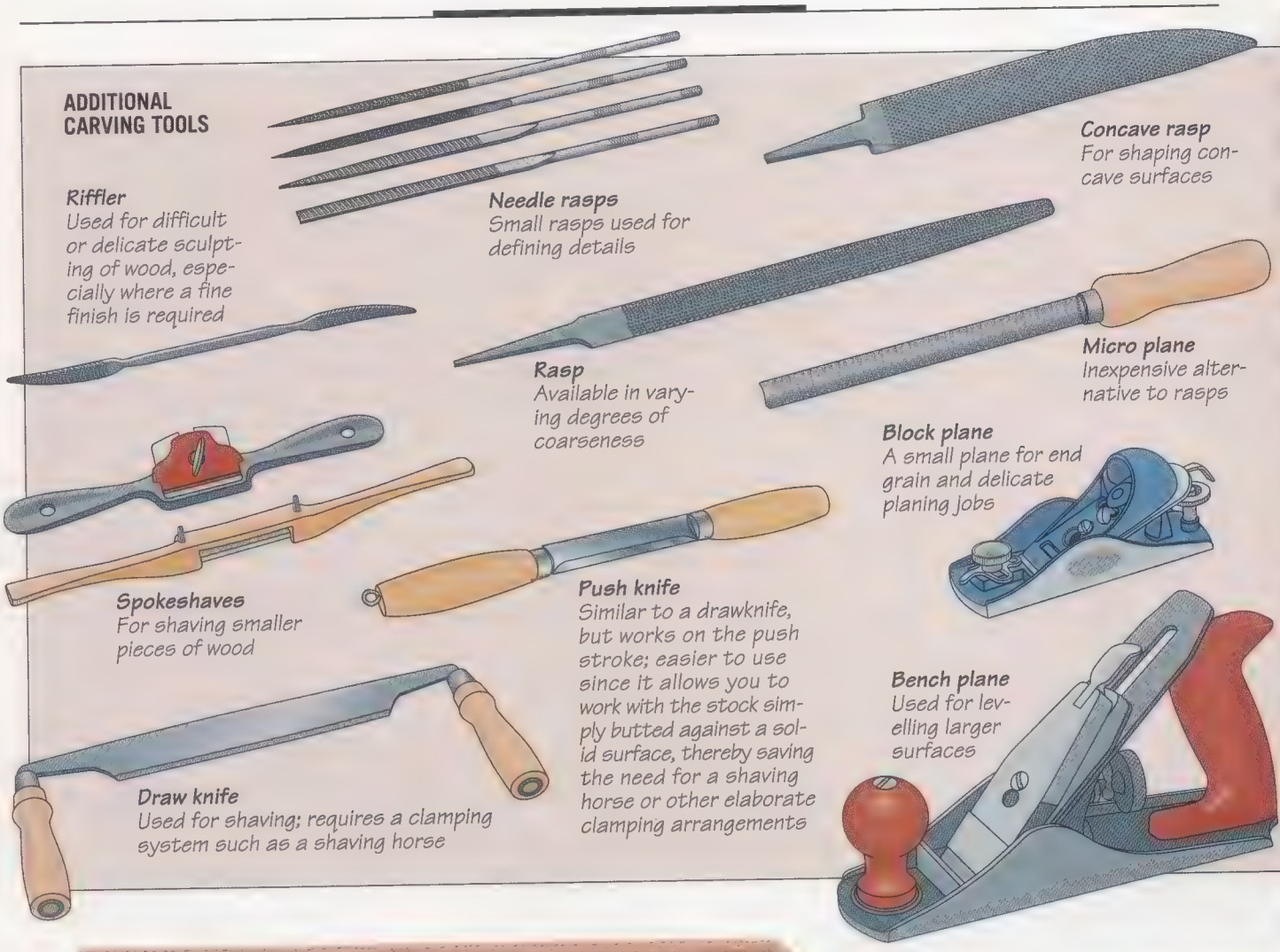
No. 23 macaroni tool



No. 6 gouge



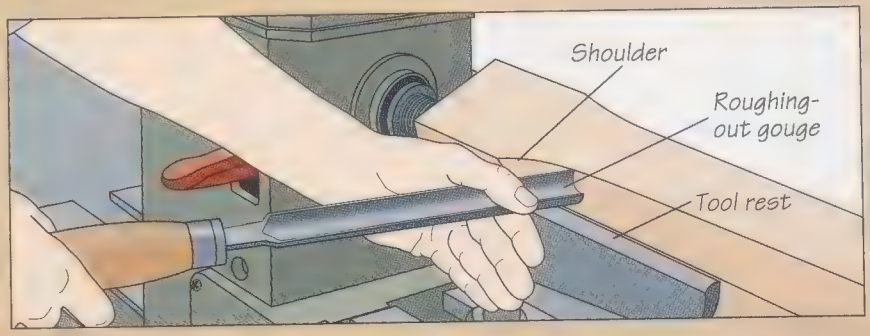
CARVING ACCESSORIES

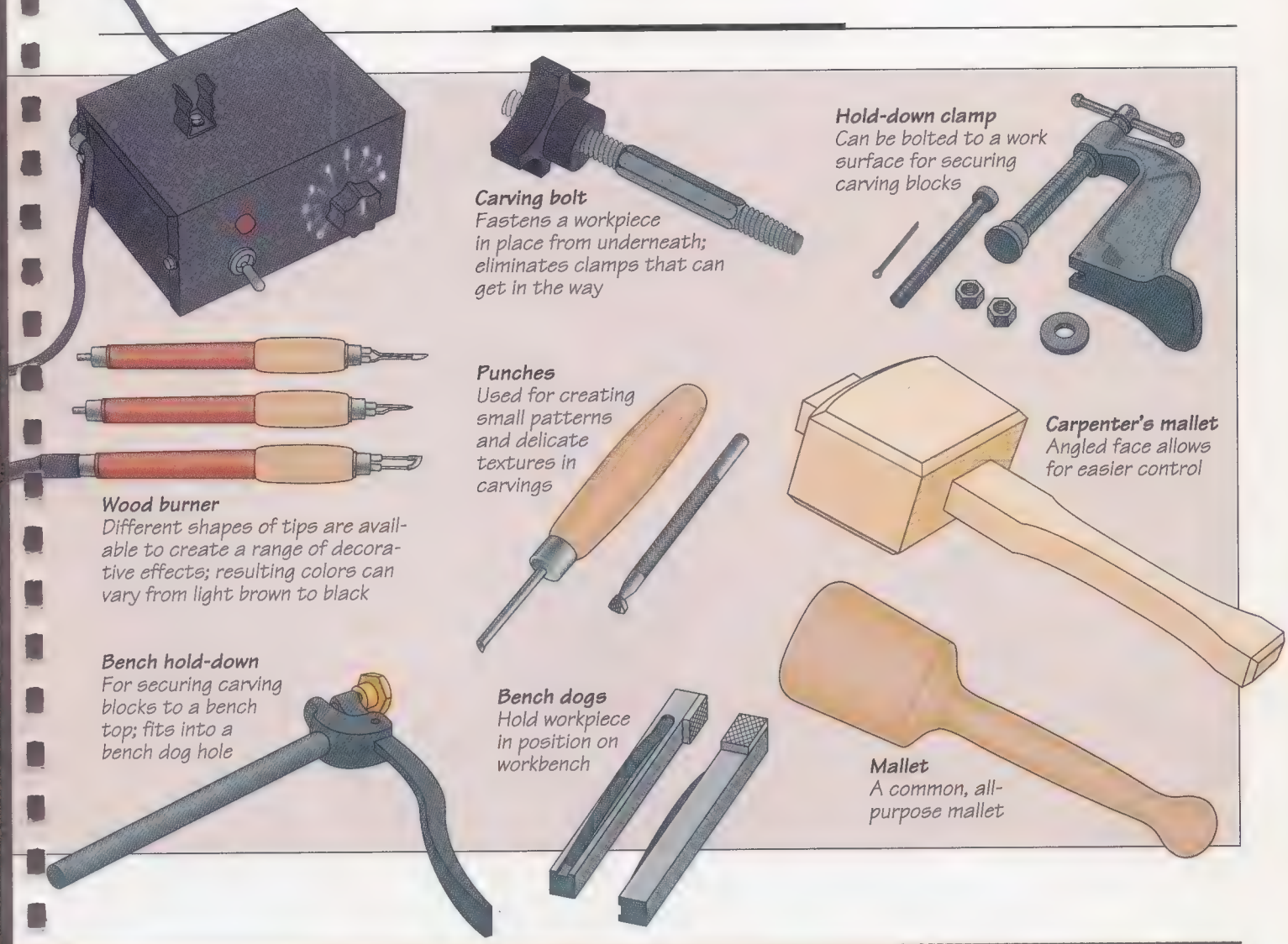


BUILD IT YOURSELF

A CARVER'S MALLET

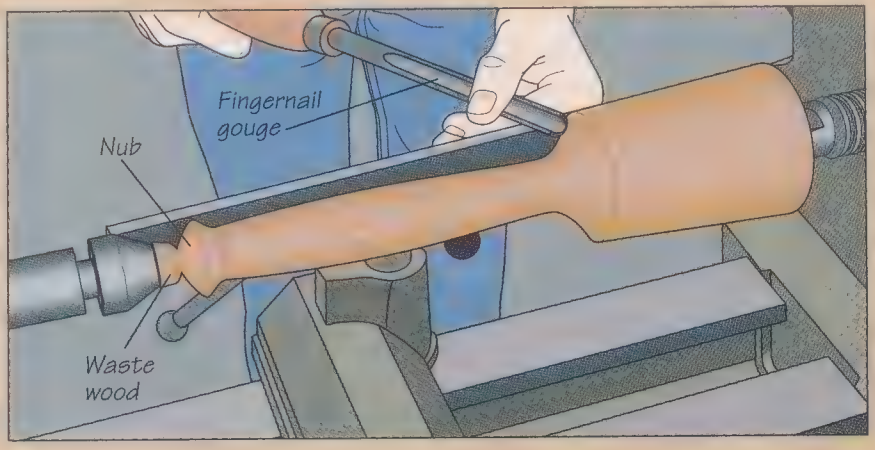
A carving mallet can be made on a lathe. Start with a blank of face-glued stock larger than the finished mallet; hickory, maple, beech, and oak work well. Mount the blank on the machine and set the tool rest as close as possible to the workpiece. Switch on the machine and round the corners of the blank with a roughing-out gouge. Holding the tip of the gouge against the blank, slowly raise the handle until the cutting edge begins slicing into the wood and the beveled edge is rubbing against the stock. Rough-shape the mallet, moving the tool from side to side, leaving a shoulder where the head will join the handle *(below)*. Finish shaping the blank using the same technique with a fingernail gouge





(right). The handle of the mallet shown has a small nub at the end to provide a better grip.

Once the shaping is done, leave the mallet on the lathe, move the tool rest out of the way, and smooth the surface of the wood with 80-grit sandpaper, moving to progressively finer grits. Then finish the mallet with tung oil. Finally, remove the mallet from the lathe, saw off the waste wood at the ends, and sand and finish the end grain.



SHARPENING TECHNIQUES

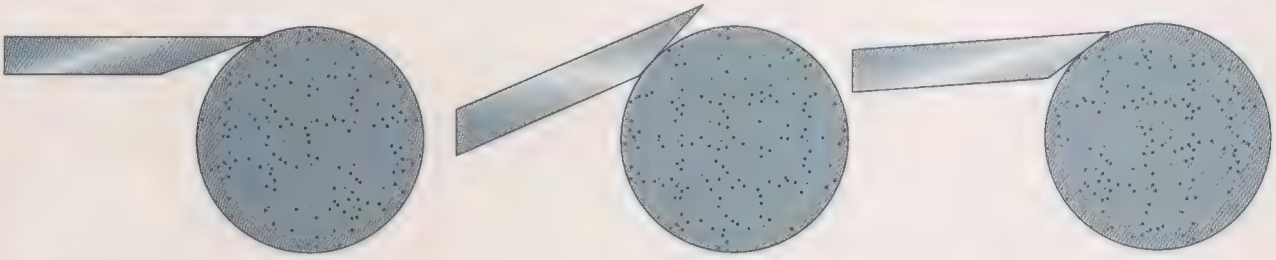
Good carving is achieved only by using properly sharpened tools. The highest-quality chisel, knife, or gouge will produce inferior results without proper sharpening. This section demonstrates the sharpening skills and tools you need to practice the craft.

The sharpening tools and accessories that you use should be chosen with care. Using a carborundum grinding stone, for example, can damage your chisel because it will overheat the cutting edge, rendering it too soft to cut properly. The high speed of most stationary grinders adds to this problem. The solution is to use rubber grinding wheels containing tiny fragments of industrial diamonds, and to buy or build a slow-speed grinder.

To test the sharpness of the cutting edge of your tool after following the sharpening instructions in this chapter, make a cut on the end of a piece of scrap wood. Working across the grain, the blade should slice evenly through the wood, producing a curl of waste wood and leaving behind a smooth surface. Also note the sound that the blade produces: A razor-sharp carving tool will make a clean, hissing sound as it slices through the wood.

Mastering the skill of sharpening your carving tools will provide one part of the basic knowledge a wood-carver requires. The other part—the fundamentals of carving—is discussed in chapter two.

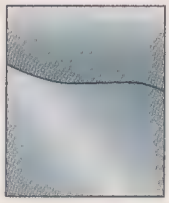
COMMON SHARPENING DO'S AND DON'TS



Too much on the edge
This will create a double bevel that will not cut properly

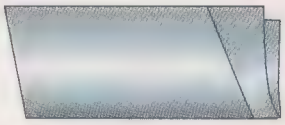
Too much on the heel
This will produce a concave bevel that will cause the chisel to gouge into the wood

Proper angle
This produces a flat bevel, with the correct angle of between 15° and 35°



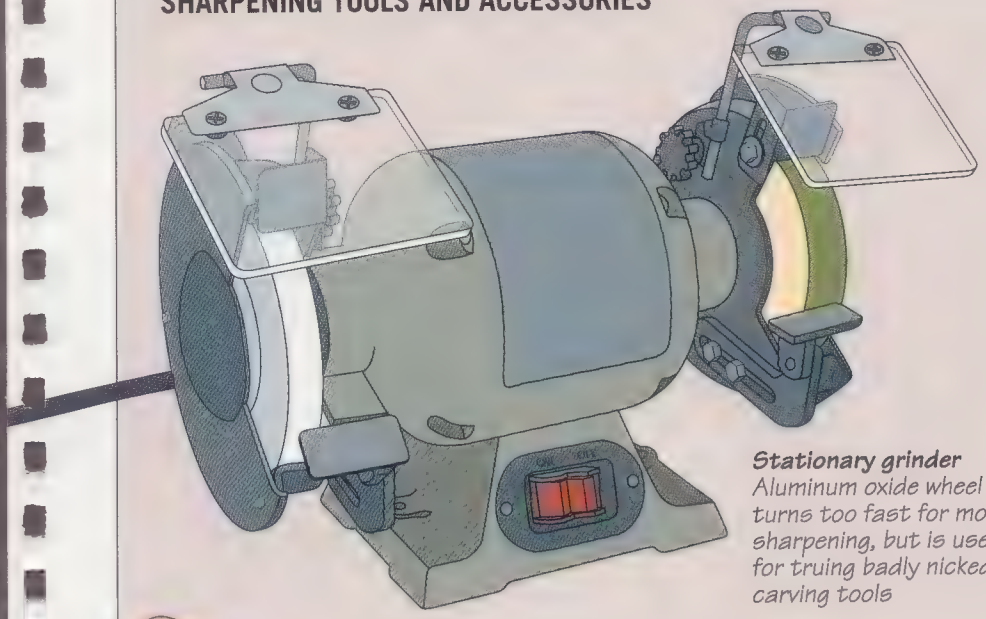
Uneven bevel
Makes the chisel difficult to control and produces uneven cuts; caused by sharpening the bevel in some areas more than others

Slanted gouge or V-tool
The cutting edge is angled forward instead of being perpendicular to the shaft, as is desirable

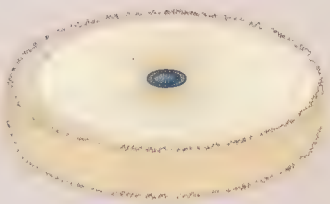


Hook on a V-tool
This point of excess metal forms at the apex of the V during the initial sharpening; it must be ground away

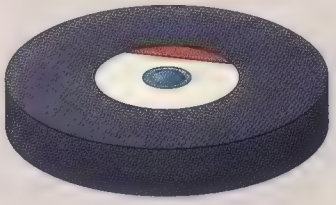
SHARPENING TOOLS AND ACCESSORIES



Stationary grinder
Aluminum oxide wheel turns too fast for most sharpening, but is useful for truing badly nicked carving tools

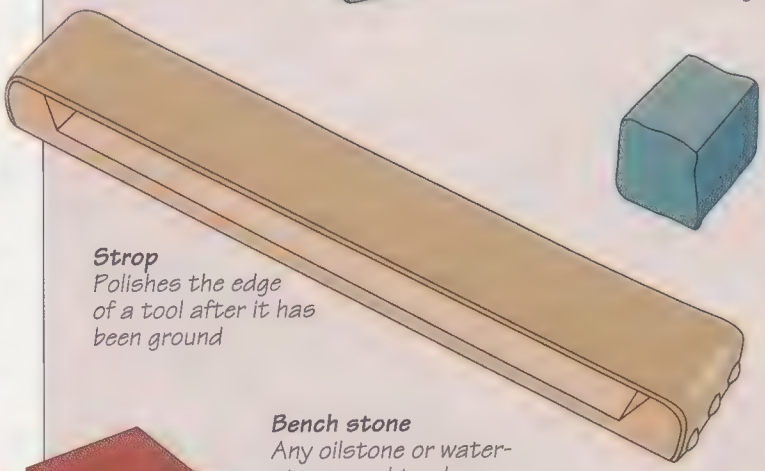


Cotton polishing wheel
Used in place of a strop to polish and hone cutting edges

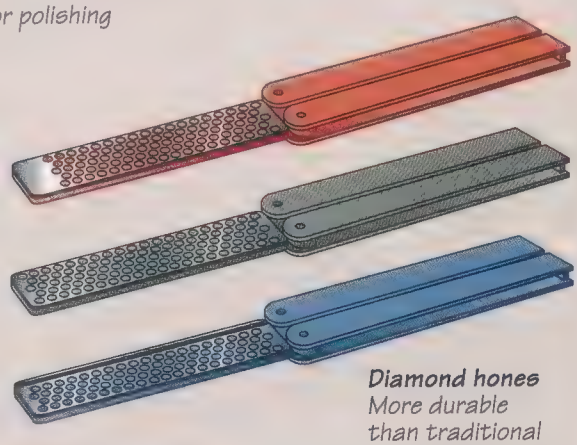


Rubber grinding wheel
The best type of grinding wheel for carving tools; tiny bits of diamond are embedded in the wheel, providing the abrasive necessary for sharpening

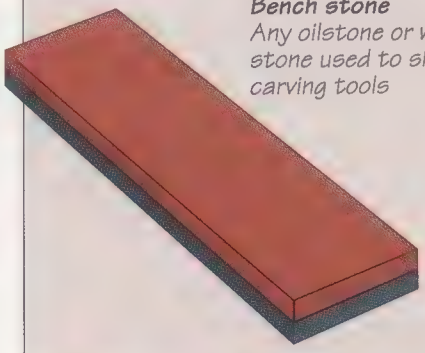
Polishing compound
Abrasive dabbed in small quantities on cotton wheels for polishing



Strop
Polishes the edge of a tool after it has been ground

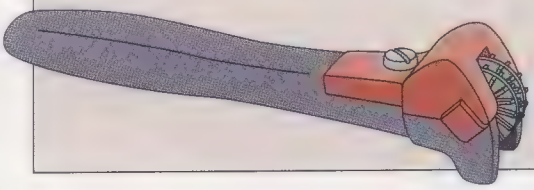


Diamond hones
More durable than traditional bench stones



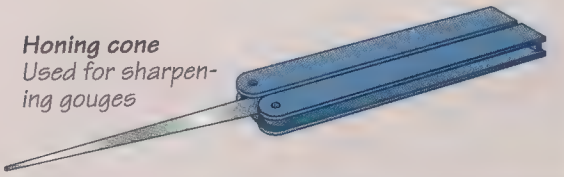
Bench stone
Any oilstone or waterstone used to sharpen carving tools

Auger file
Used for sharpening small, hard-to-reach cutting edges

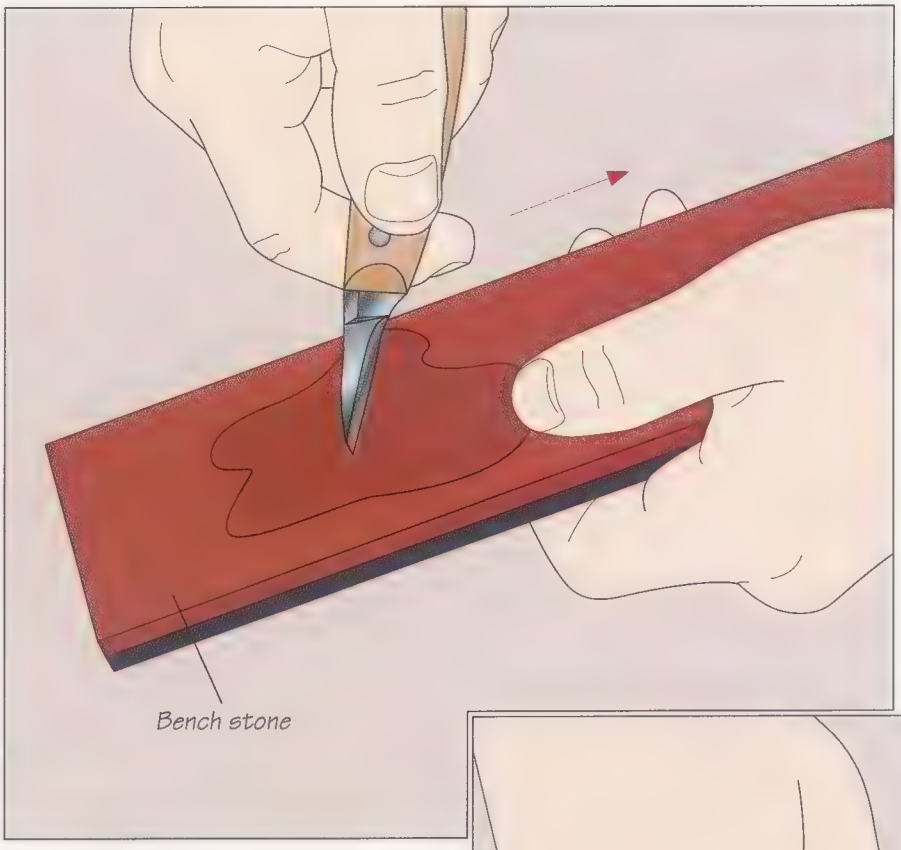


Wheel dresser
Used periodically to true the surface of a grinding wheel

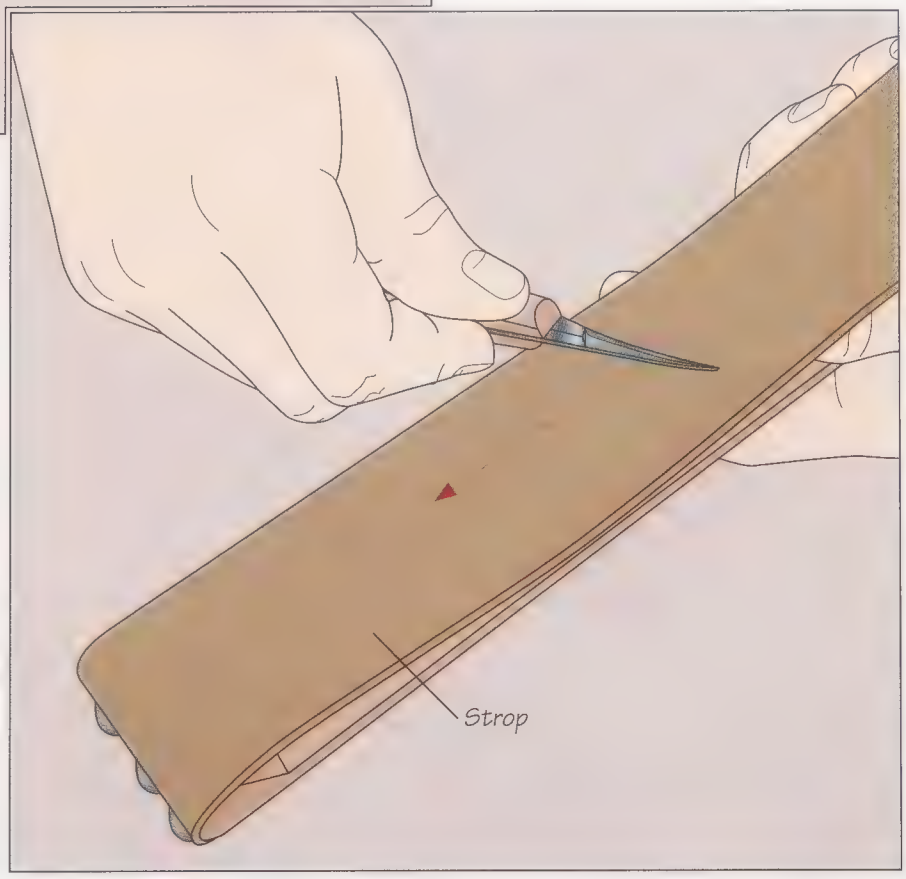
Honing cone
Used for sharpening gouges



SHARPENING A KNIFE

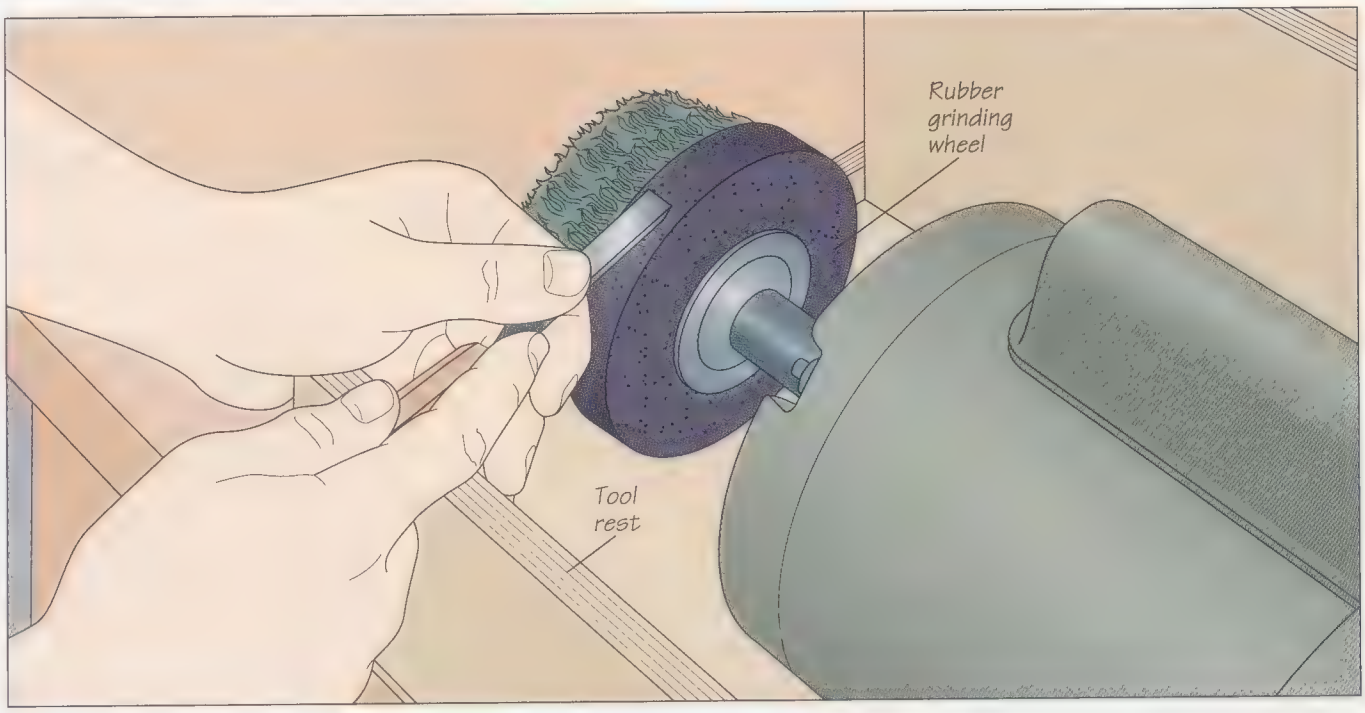


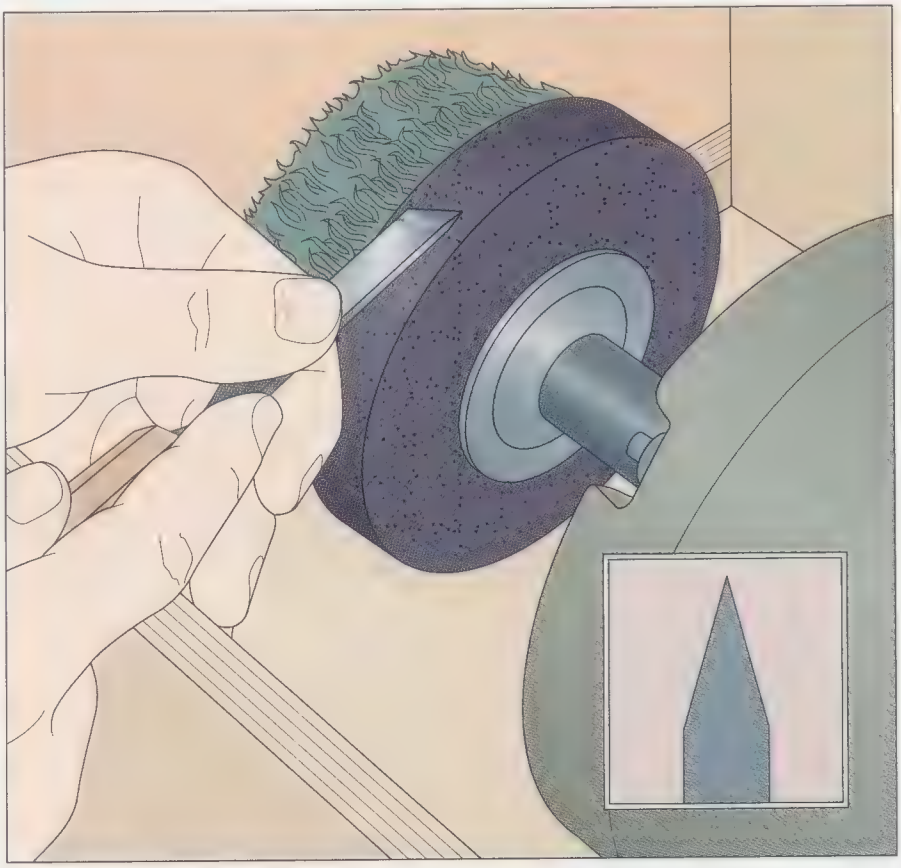
1 Honing the cutting edge
Apply the appropriate lubricant to your sharpening stone, then hold the blade of the knife at a 15 to 35 degree angle. A lower angle is more suitable if you are working with softwood; a higher angle will work better with hardwood. Slice toward yourself as if you were trying to slice a piece from the stone, making sure you keep your other hand well clear of the cutting edge *(left)*. Then make a cut in the opposite direction. Continue, alternating the direction of your slicing.



2 Stropping the knife
Sharpening will create tiny burrs on the cutting edge that can be removed with a leather strop. Holding the strop in one hand, draw the blade across the strop away from the cutting edge *(right)*. (Stropping into the edge will cause the knife to cut the strop.) Repeat the process on both sides of the blade.

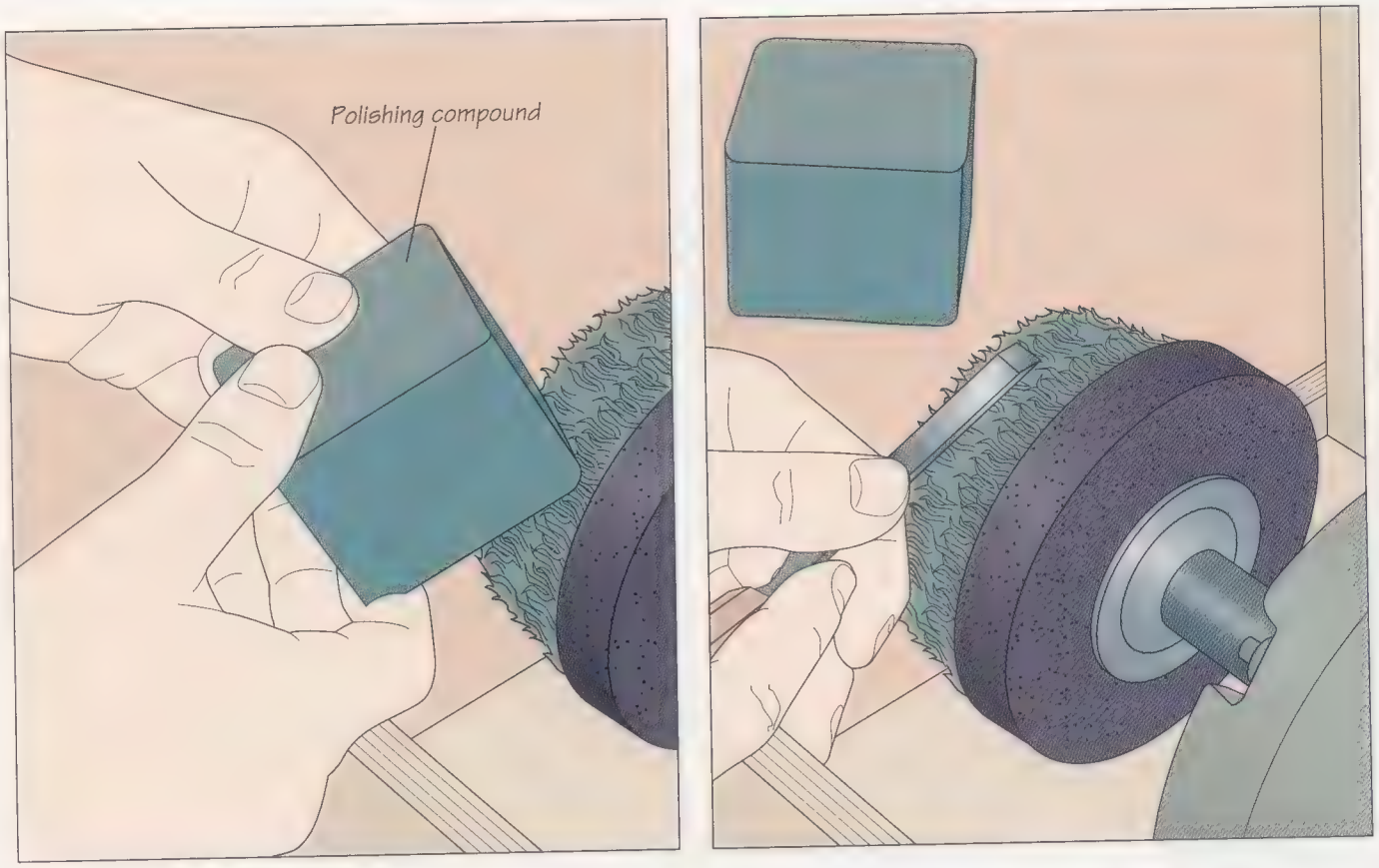
SHARPENING A CHISEL ON A GRINDER





1 Honing the cutting edge

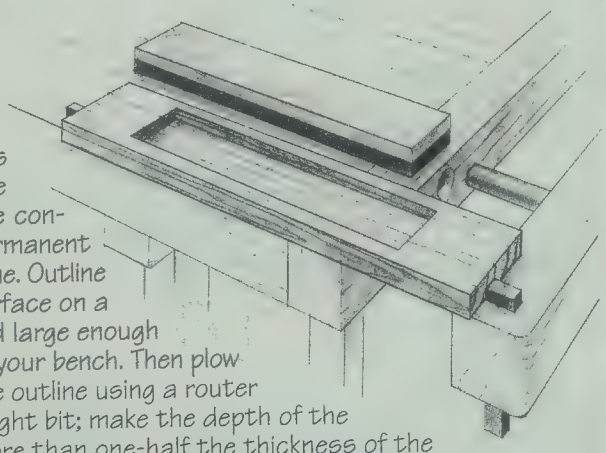
Install a rubber grinding wheel and a cloth wheel on a bench grinder. Holding the blade between the index finger and thumb of one hand, set the handle on the tool rest and start grinding at the heel of the bevel. A thin edge of reflected light will be visible at the tip of the blade *(above)*. Draw the chisel down the grinding wheel until the extreme end of the cutting edge touches the grinding wheel. At this point, the thin line of the reflection will disappear. The final bevel should vary between 15 and 35 degrees, with a steeper angle required for cutting hardwoods. A skew chisel is sharpened the same way *(left)*, except that you need to perform the process on both sides of the blade since it has a bevel on each face *(inset)*.



2 Buffing the chisel
Apply some polishing compound to the cloth wheel on your grinder while it is spinning. Then hold one side of the chisel edge against the wheel *(right)*. Flip the chisel over and polish the opposite side. This will remove any small burrs left by the honing process.

SHOP TIP

A sharpening-stone holder
Carvers must sharpen their tools frequently. To make the process more convenient, build a permanent home for your stone. Outline the sharpening surface on a piece of solid wood large enough to be clamped to your bench. Then plow a recess within the outline using a router fitted with a straight bit; make the depth of the recess slightly more than one-half the thickness of the stone. Square the corners of the recess with a chisel and store the stone in the holder. When you need to sharpen, simply secure the board to your workbench.



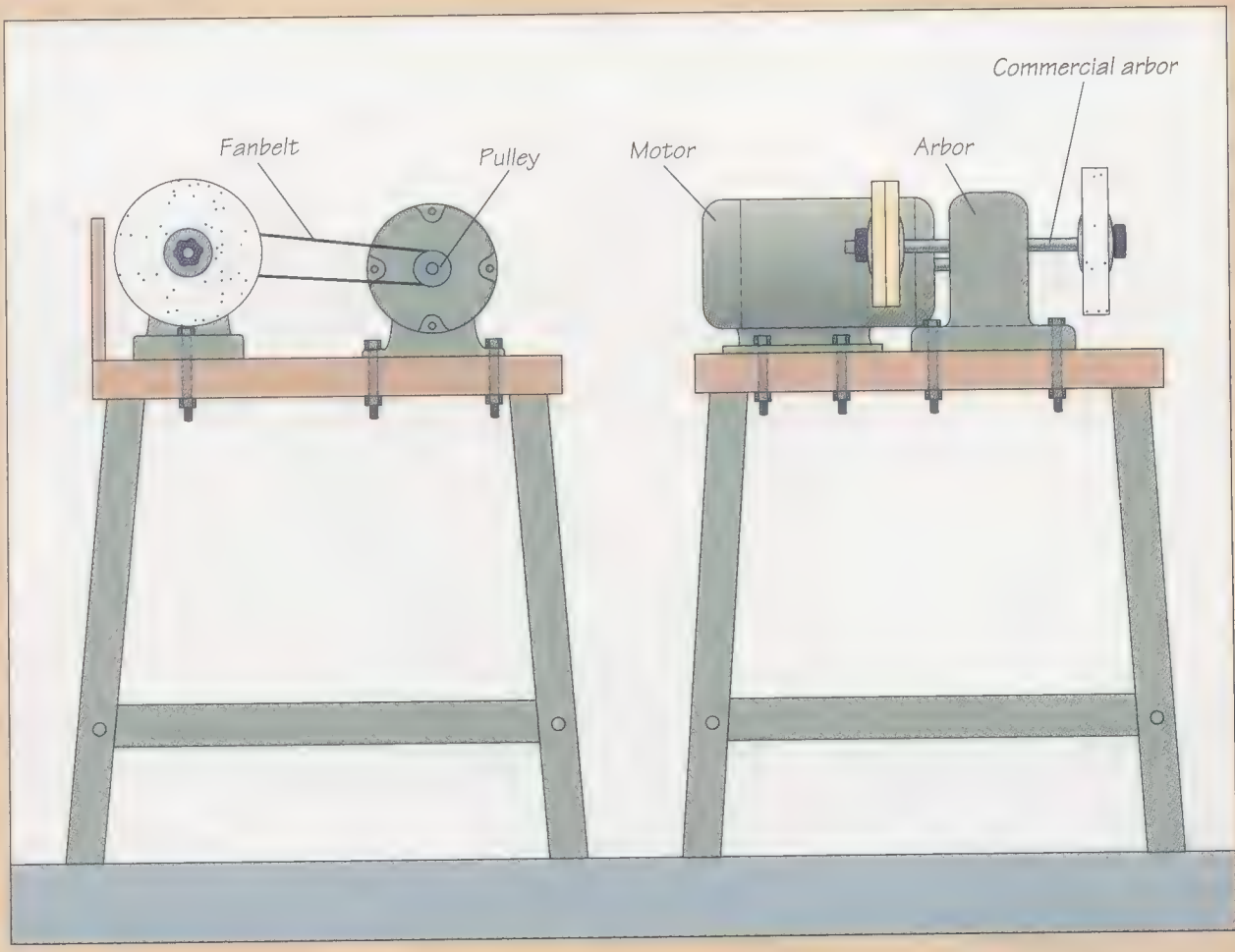
BUILD IT YOURSELF

A BENCH GRINDING STATION

This shop built grinding station rotates the wheel so the grinding surface turns away from the operator, contrary to the rotation of a standard bench grinder. This is better for carving tools as it allows a lighter touch of the blade against the grinding wheel to hone the cutting edge, which in turn prevents overheating the tool. This station also permits you to reduce the wheel's speed simply by increasing the size of the pulley on the arbor.

Bolt a 1/4-horsepower motor to the rear of your work surface. The surface should be at least an inch thick —preferably two inches—and stand 30 to 36 inches off the floor, depending on your height and the level at which you like to work. Mount a small pulley on the motor. Use a commercial arbor to mount the grinding wheels. The arbor should be bolted so its pulley is in line with the motor pulley. The pulley on the arbor should be sized to reduce the revolutions of the motor to between 800 and 1,100 rpm on the grinder. So, if the motor rotates at 1,750 rpm, you will need roughly half that speed for the grinding wheels. Therefore, the diameter of the pulley on the arbor should be twice that of the pulley on the motor.

A V-belt transfers power from the motor to the arbor. Make sure the arbor is positioned so the belt is taut and you have a space four inches wide in front of the grinding wheel to mount a tool rest. (Some arbors come equipped with their own tool rest.)



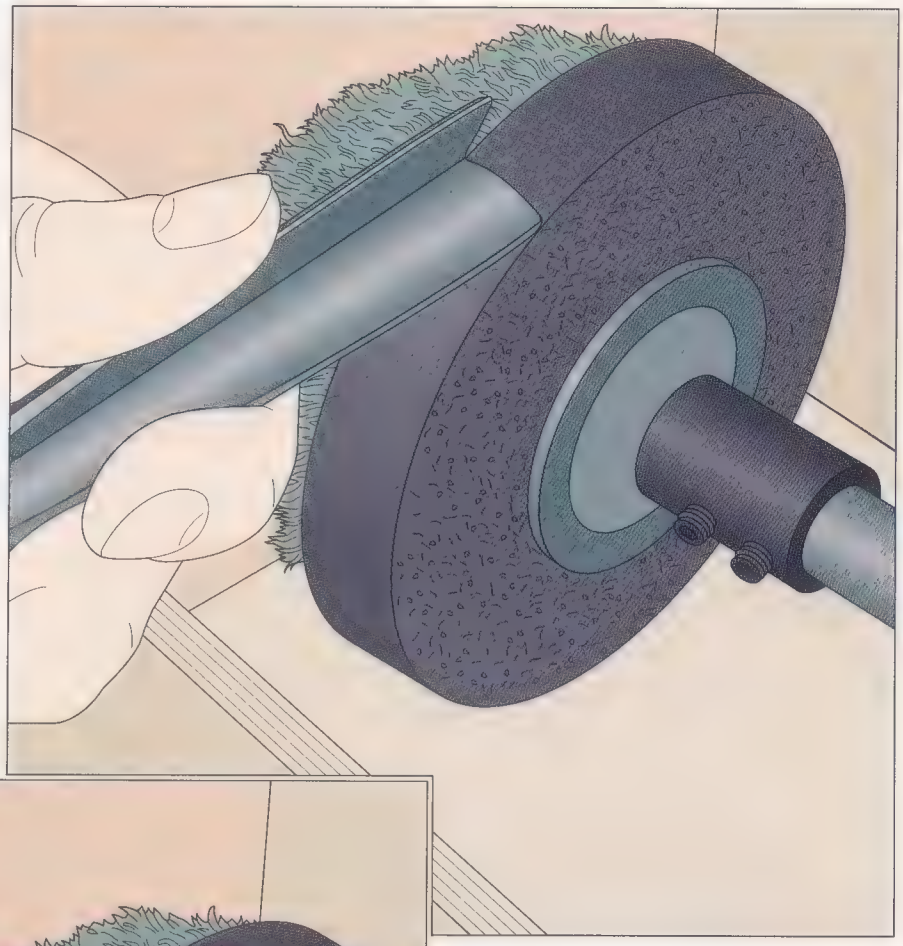
SHARPENING A CHISEL ON A BENCH STONE

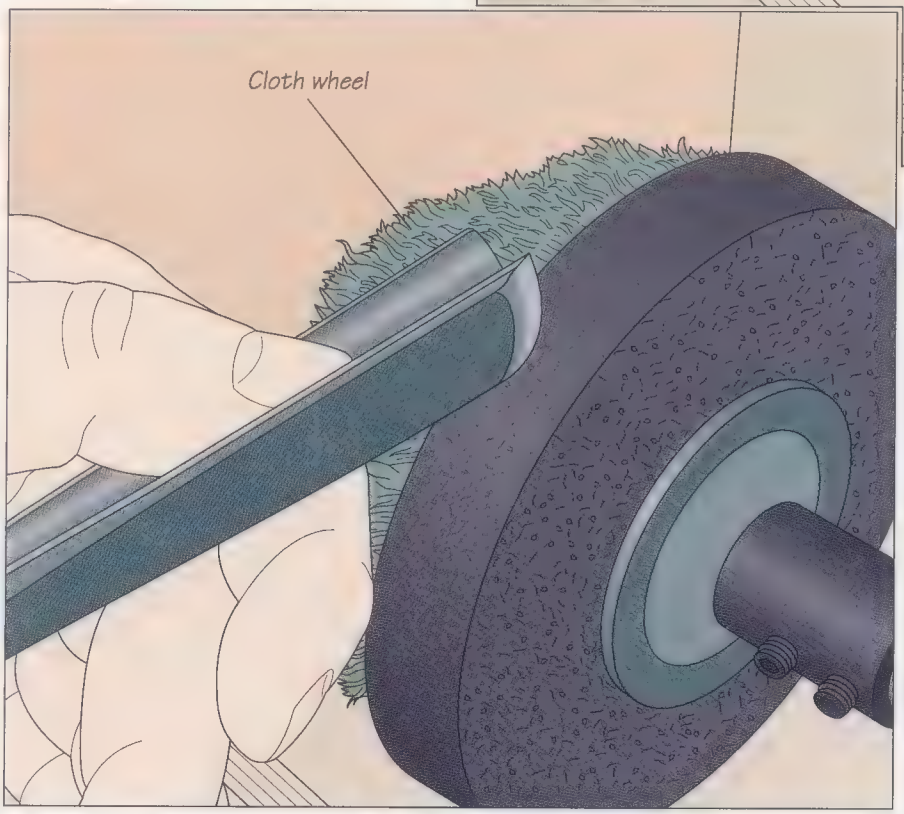
1 Grinding the edge
Apply the appropriate lubricant to the bench stone, then place it on a work surface. Grasp the stone with one hand. With the other hand, hold the blade with the bevel flat on the stone. Rub the cutting edge in a circular motion *(left)*. Do not rock the chisel or hold it at too steep an angle or you will end up forming a double bevel on the blade.

2 Polishing the cutting edge
Use a leather strop or the buffing wheel of a bench grinder to polish both sides of the blade. If you are using a strop, hold it in one hand, while drawing the edge of the chisel toward you *(right)*. Draw both the top and bottom across the strop several times, to remove any tiny burrs, and the bevel is polished to a fine edge.

SHARPENING A V-TOOL

1 Grinding the edges
Treat the cutting edge as if it were two separate flat chisels *(see page 23)*. Start grinding at the rear of the heel of the bevel. A thin line of light will appear at the tip of the blade. Slowly draw the chisel down the wheel until the tip of the cutting edge touches the wheel. The reflected light should disappear.





2 Removing the point
After grinding the two edges of the V-tool, a slight hook will form where the edges meet *(see page 20)*. Remove this point by resting the V-tool on the grinding wheel, with the hook just touching the wheel. Rock the tool gently from side to side until the point is removed *(left)*. Then buff both sides of the cutting edge on a cloth wheel.

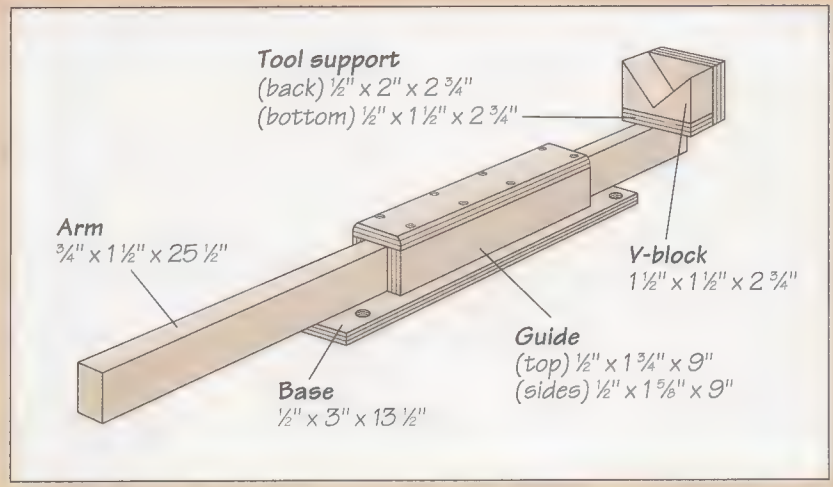
BUILD IT YOURSELF

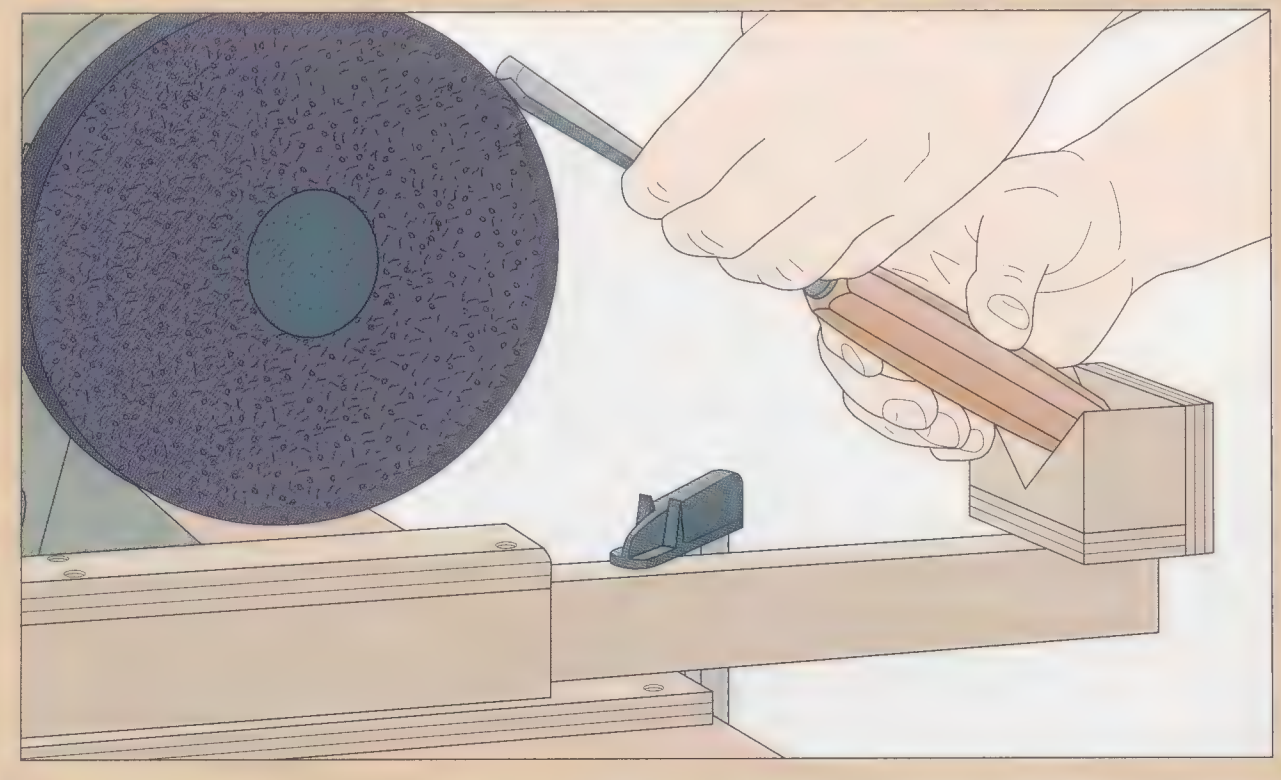
GOUGE-GRINDING JIG

The jig shown at right allows you to hold a gouge at the correct angle for grinding. The dimensions will accommodate most gouges. Cut the base and guide from ½-inch plywood. Screw the guide together and fasten it to the base with countersunk screws. Make the guide opening large enough for the arm to slide through freely.

Cut the arm from 1-by-2 stock and the tool support from ½-inch plywood. Screw the two parts of the tool support together, then fasten the bottom to the arm flush with one end. For the V-block, cut a small block to size and saw a 90° wedge out of one side. Glue the piece to the tool support.

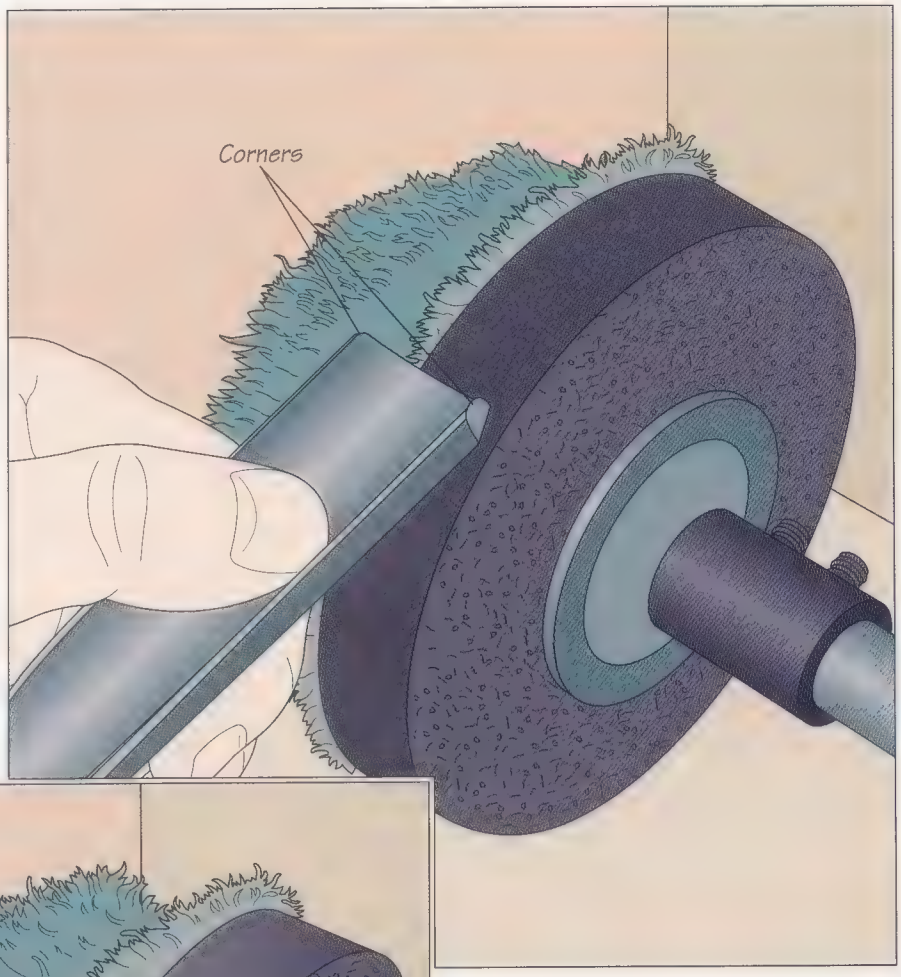
To use the jig, secure it so the arm lines up directly under the grinding wheel. Seat the gouge handle in the V-block and slide the arm so the beveled edge of the gouge sits flat on the grinding wheel. Clamp the arm in place. Then, with the gouge clear of the wheel, switch on the grinder and reposition the tool in the jig. Roll the beveled edge across the wheel *(below)*.

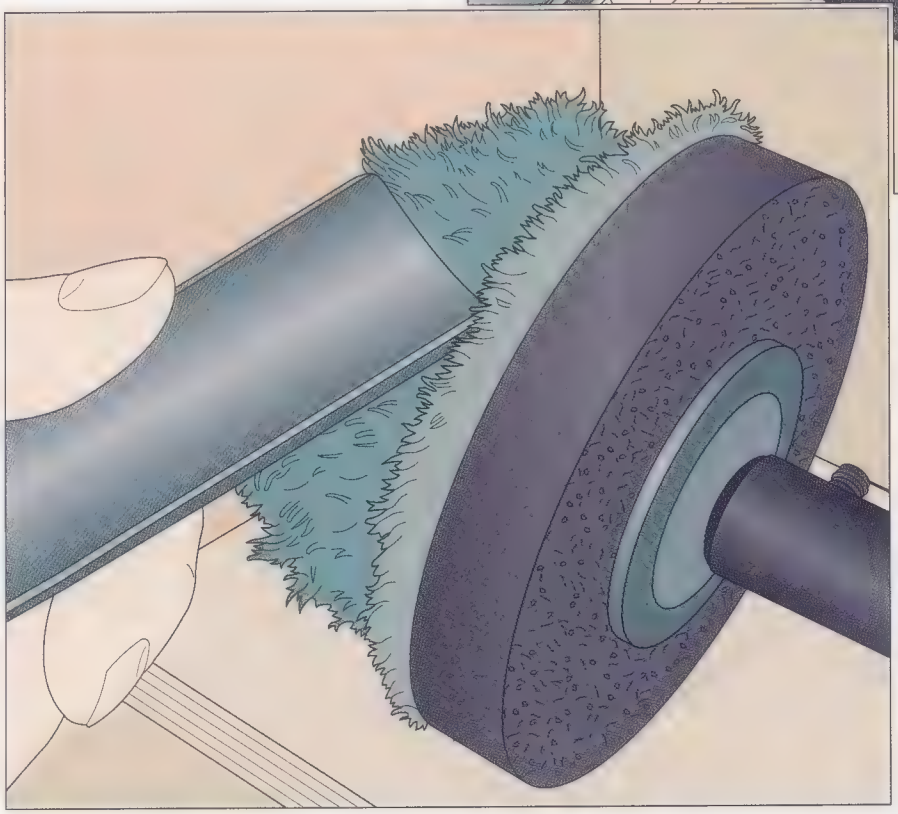




SHARPENING A GOUGE

1 Honing the cutting edge
Holding the blade between the fingers and thumb of one hand, set the heel of the bevel on the wheel. Roll the gouge from side to side, grinding as evenly as possible. Slowly draw back the gouge, sliding it down the surface of the grinding wheel as you continue a sideways rolling motion. A thin line of reflected light at the extreme edge of the gouge will be visible until you begin grinding the extreme edge. This sliver of light will disappear, indicating you have reached the edge *(right)*. Do not slide the gouge any further, or you will create a double bevel. Make certain that the edge is perpendicular to the shaft—it should not jut forward, nor recede beyond the corners of the cutting edge *(see page 20)*. These corners should be pointed, not rounded.





2 Polishing the cutting edge
Polish the cutting edge of the gouge with a cotton wheel *(left)*. You can buff the inside face, but do not attempt to grind it. Grinding could change the geometry of the gouge and reduces the carving ability of the tool.

GETTING STARTED

To learn the rudiments of carving takes an afternoon; to master the craft can occupy a lifetime. However long, the journey from novice to master can be eminently enjoyable, yielding many successful and satisfying pieces. Fortunately, you can master the basics of all carving with a few deft movements of a chisel. As explained starting on page 38, these strokes are based on several rules: Carve with the grain, work toward the waste and not the form, and carve from the shortest length of grain toward the longest. The moves are simple, but nothing can take the place of practice. With enough experience you will learn by the feel and even by the sound of a chisel slicing through the wood whether you are following these simple rules.

Behind every successful wood carving lies a precise, detailed pattern. Transferring the pattern to a workpiece can be done in a number of ways; for designs that are not scaled and are the same size, a sheet of carbon paper taped to the blank (above) *does the trick.*

Choosing the most appropriate species of wood for a given project is as important in carving as in any other type of woodworking—perhaps more so, since you cannot rely on the power of a tool to do the work for you. Start with fine-grained softwoods, such as basswood. Then, as your skill develops, you will be able to carve the more challenging, highly figured hardwoods. A list of the most commonly used carving woods is shown on page 32.

With experience, a carver's workshop may change. In any case, it is quite simple compared to a woodworking shop, which often has three or more major machines and a stable of power tools and hand tools. As shown on page 33 you can do quite nicely in a space large enough for a workbench and a tool chest. With a little more space, you can add another work surface and a band saw—a helpful device for reducing blanks to rough size for carving.

Firm clamping is essential for safety, but it poses special problems, because of the irregular shapes with which a carver frequently works. A workpiece that shifts can cause the carver to lose control of a chisel, damaging the piece or causing an injury. Two helpful shop-built jigs are shown on pages 36 and 37 that will satisfy many of your clamping needs.

Working safely with a sharp tool means always keeping both hands behind the blade. It is best to lay out your chisels with the edges facing away from you, to avoid nasty cuts as you reach for a tool. Remember to wear sturdy shoes. A gouge or other tool that drops from a workbench can do considerable damage to unprotected feet. Since carving should be done standing up, try to work with carpeting or an anti-fatigue mat on the workshop floor. Your feet, legs, and back will notice the difference, especially if you work for several hours at a time. The padded surface will also protect the edges of your tools should you drop one.

This carving of a bear is supported on a shop-built carving arm. The jig, shown on page 36, allows a workpiece to be positioned at whatever angle is most comfortable.

WOOD FOR CARVING

The best carving woods are close grained. Softwoods, with little figure in the grain are easier to use for novices. As a carver's experience grows, more difficult stocks, such as burled hardwoods, become suitable choices. In general, soft, fine-textured woods with straight grain are best for small projects and detailed work.

Hardwoods, such as oak and walnut, make excellent carving woods, because they leave a smooth, defined surface. Their hardness, however, makes them difficult wood for beginners to work. Lime, pear, and basswood are straight-grained and easily worked by novices, but they are also favorite choices of experienced craftsmen too. Whatever your choice, remember to select wood that is well seasoned.

The nature of the finished project also affects the choice of wood for a project. A door panel, for example, would best be carved from oak or mahogany, because durability is an important factor for such a piece. A purely decorative carving, such as the bear on page 30, should be made from a wood capable of holding fine details, such as lime or basswood. Another consideration is the density of a given wood. A very heavy wood, such as lignum vitae, will render large pieces heavy and unwieldy.

CARVING WOODS

WOODS	CHARACTERISTICS
Apple	Reddish brown to light red; hard with fine grain; carves well
Basswood	Creamy white darkening to creamy brown; soft with fine texture; carves very well
Birch	Creamy white to pale brown; hard with fine texture; straight-grained pieces carve well
Butternut	Medium light brown; moderately soft with somewhat coarse texture; carves very well
Cedar, aromatic	Reddish brown; moderately soft, very fine-textured; carves well
Cherry, black	Reddish brown to deep red; hard with fine texture; carves moderately well
Holly	White to grayish white; very fine texture; carves well
Jelatong	Light yellowish white; soft, very fine-textured; carves exceptionally well
Mahogany, Honduras	Light reddish brown to medium red; hard with medium coarse texture; carves well
Maple, soft	Cream to light brown; moderately hard with fine texture; carves well
Oak, white	Light tan with yellowish tint; hard with coarse texture; carves with difficulty
Padauk	Deep red to purple-brown with red streaks; hard with moderately coarse texture; carves moderately well
Pear	Pinkish brown; hard with very fine texture; carves very well
Pine, sugar	Light cream; soft with fine texture; carves very well
Poplar	White sapwood to pale brown heartwood; soft with fine texture; carves well
Purpleheart	Deep purple; hard with moderate to coarse texture; carves moderately well
Rosewood, Indonesian	Golden brown to dark purple-brown with black streaks; hard with medium texture; carves moderately well
Sycamore	Pale reddish brown; hard with fine grain; carves moderately well
Teak	Golden brown to rich brown with darker streaks; hard with coarse texture; carves well
Walnut	Dark brown to purplish black; moderately hard with medium coarse texture; carves very well

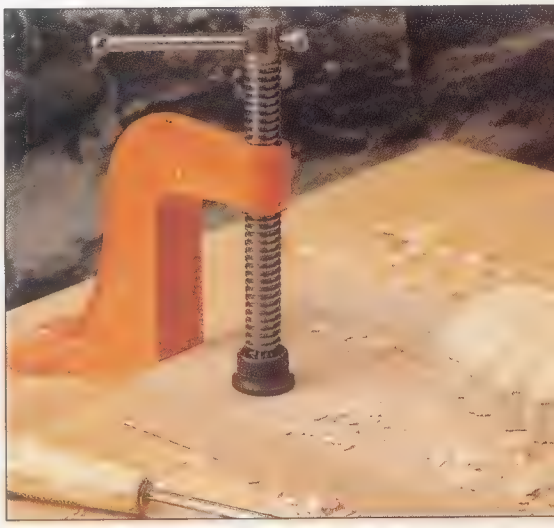
A CARVER'S WORKSHOP

The two layouts of carver's workshops shown below demonstrate the flexibility of the craft of carving. The small shop on the right is suitable for a craftsman with limited space. The larger studio boasts additional work surfaces, as well as dedicated band saw and bench grinder stations.

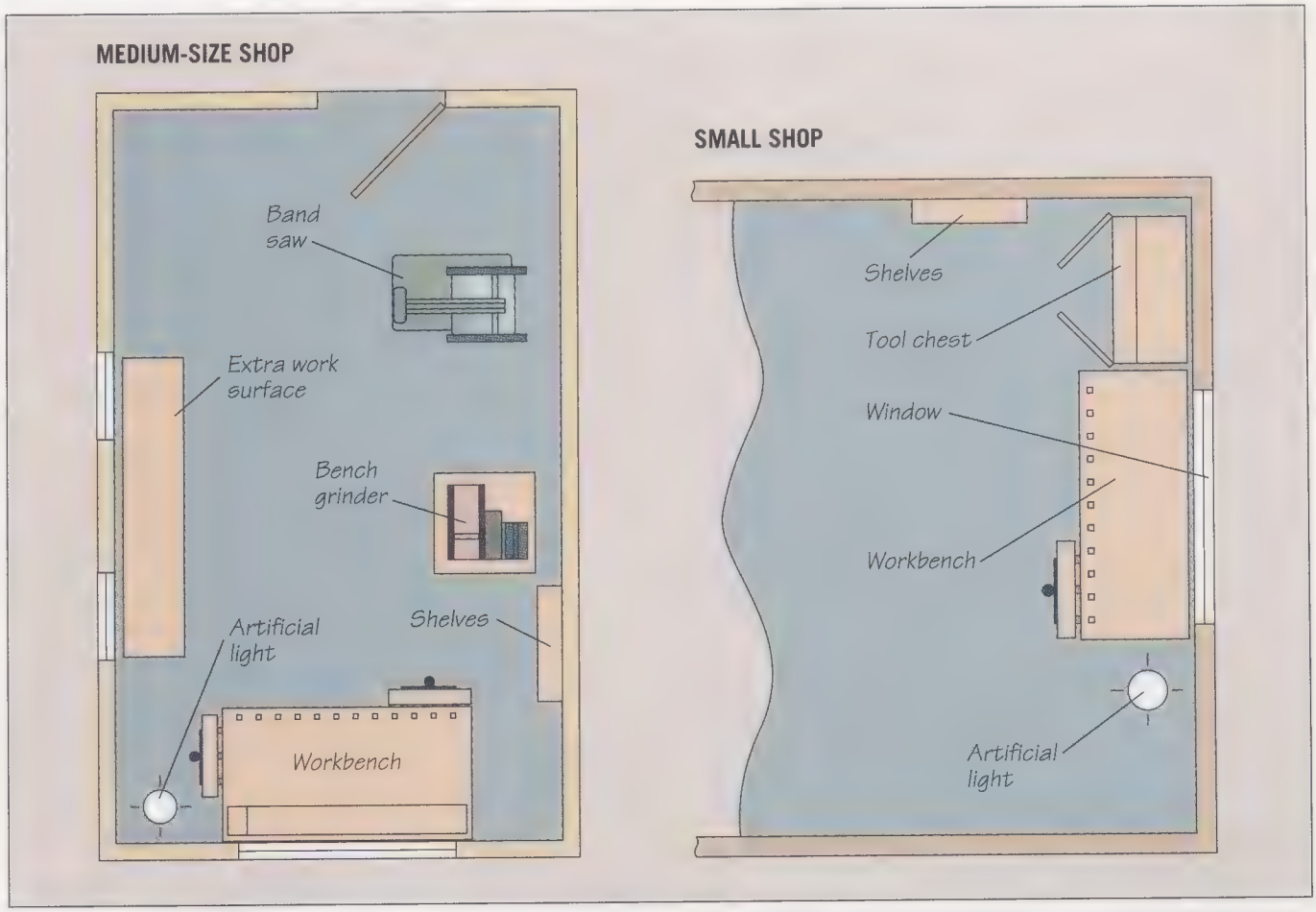
Work surfaces should be wide and long enough so that all the chisels being used can be laid out in a row. To improve their efficiency, wood-carvers traditionally start a project by laying out all the tools they plan to use along the far edge of the carving block on the workbench. The tools are positioned by frequency of use, with the most-often used on the left, and the less frequently used tools on the right. The blades face away from the carver for safety. At each step of the carving process, the tools that are immediately involved are positioned alongside the left-hand end of the workpiece with their blades facing away.

Lighting must be ample but must also cast shadows, unlike the flat light of a cabinetmaker's shop, so that wood texture and carving details are visible to the carver at all times. In each shop layout, the main work surface faces a window, with an artificial light at right angles to the window.

Carver's benches should be extremely sturdy, as they will be constantly subjected to aggressive pulling and pushing motions. In addition, these benches should be weighted or anchored, so as not to shift as the carver puts pressure on the workpiece.



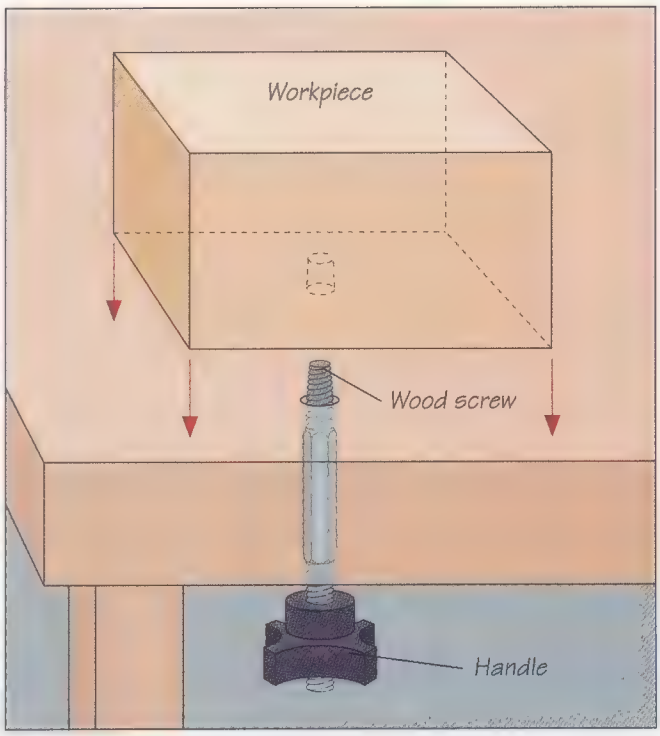
This hold-down clamp fits into a workbench recess originally intended for a bench dog.



SOME CLAMPING TECHNIQUES

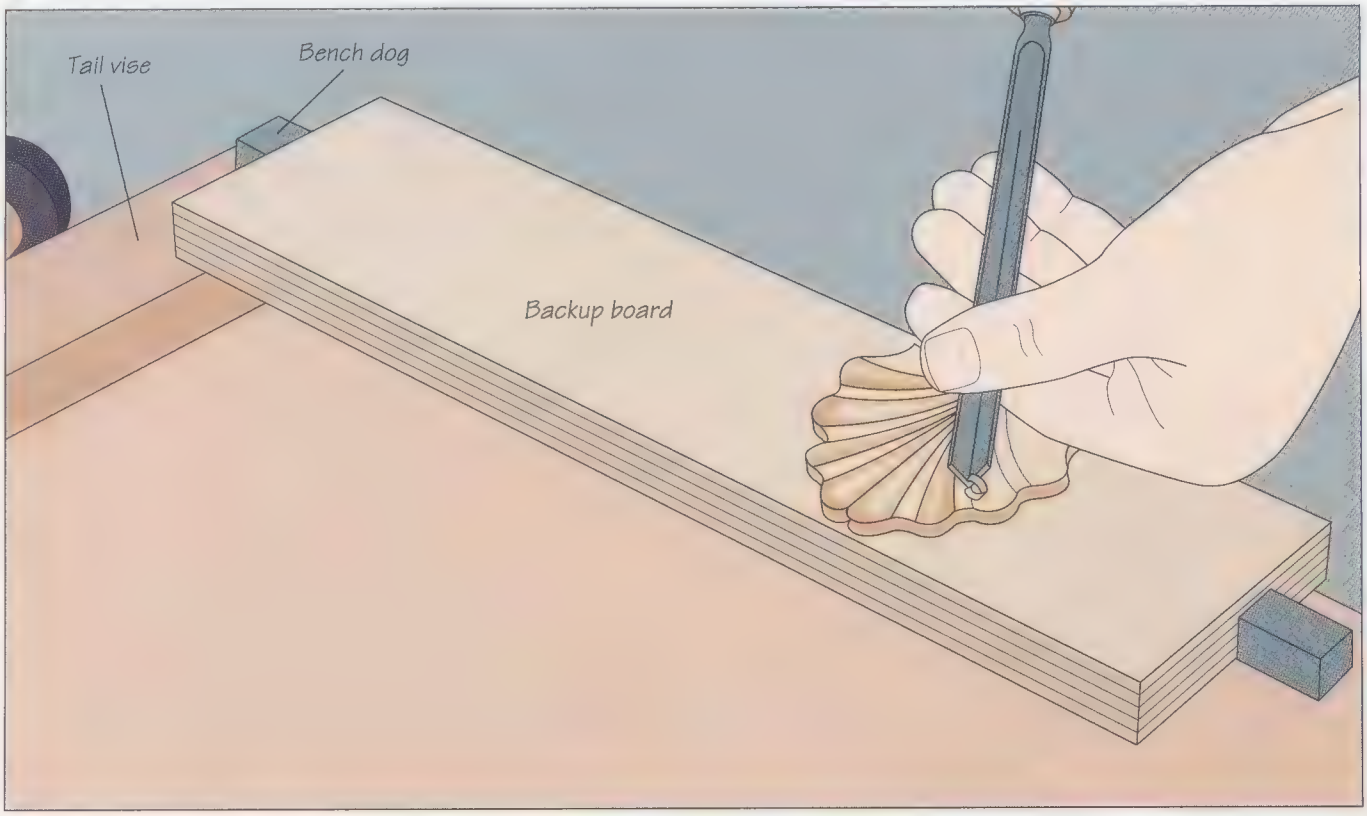
A carver's screw

This clamps the workpiece in place, and is especially suitable when the finished item will have a flat, uncarved base. Drill a hole into the base of the workpiece, slightly smaller than the wood thread on the carver's screw. The screw is then pushed through a hole in the workbench *(right)*. This hole should be just large enough to accept the shaft of the carver's screw. If the bench hole is too large, the workpiece will move. Screw the stock onto the wood screw, then tighten the handle at the other end until the workpiece is held firmly against the bench. The unthreaded length of the carver's screw must be shorter than the thickness of the top of the workbench.



Clamping a relief carving with bench dogs

Fasten the blank to a backup board, using glue and newspaper. Butt the board against a bench dog set in a hole along the edge of the workbench. At the other end, a bench dog is fitted into the tail vise, which is tightened until the workpiece is held firmly in place *(below)*.



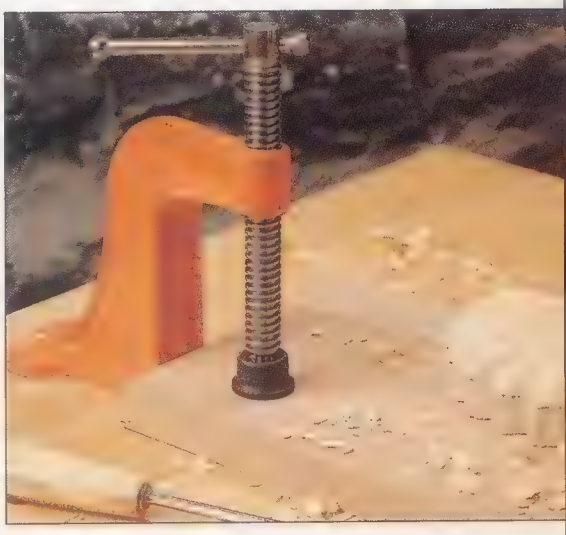
A CARVER'S WORKSHOP

The two layouts of carver's workshops shown below demonstrate the flexibility of the craft of carving. The small shop on the right is suitable for a craftsman with limited space. The larger studio boasts additional work surfaces, as well as dedicated band saw and bench grinder stations.

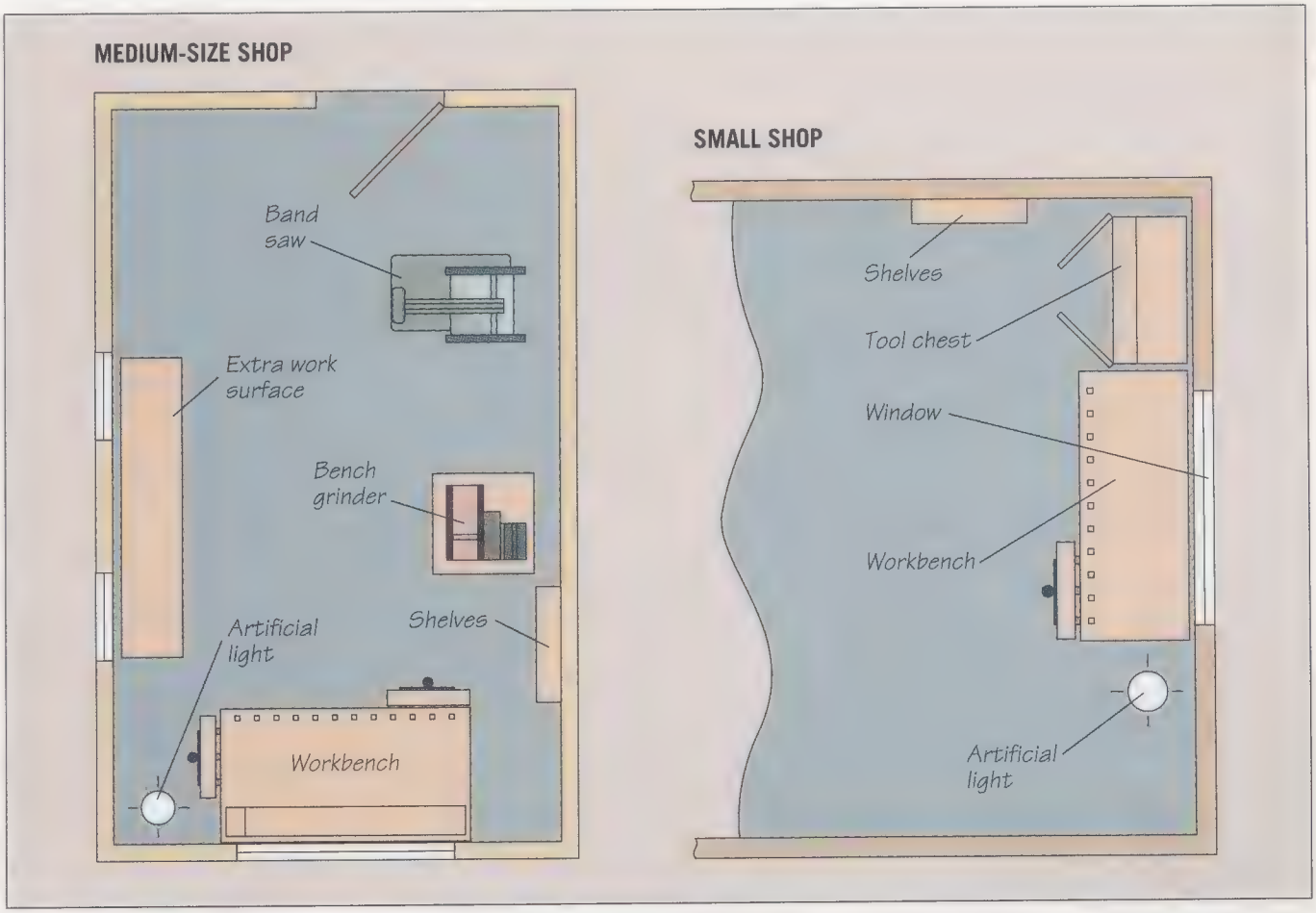
Work surfaces should be wide and long enough so that all the chisels being used can be laid out in a row. To improve their efficiency, wood-carvers traditionally start a project by laying out all the tools they plan to use along the far edge of the carving block on the workbench. The tools are positioned by frequency of use, with the most-often used on the left, and the less frequently used tools on the right. The blades face away from the carver for safety. At each step of the carving process, the tools that are immediately involved are positioned alongside the left-hand end of the workpiece with their blades facing away.

Lighting must be ample but must also cast shadows, unlike the flat light of a cabinetmaker's shop, so that wood texture and carving details are visible to the carver at all times. In each shop layout, the main work surface faces a window, with an artificial light at right angles to the window.

Carver's benches should be extremely sturdy, as they will be constantly subjected to aggressive pulling and pushing motions. In addition, these benches should be weighted or anchored, so as not to shift as the carver puts pressure on the workpiece.



This hold-down clamp fits into a workbench recess originally intended for a bench dog.



SOME CLAMPING TECHNIQUES

A carver's screw

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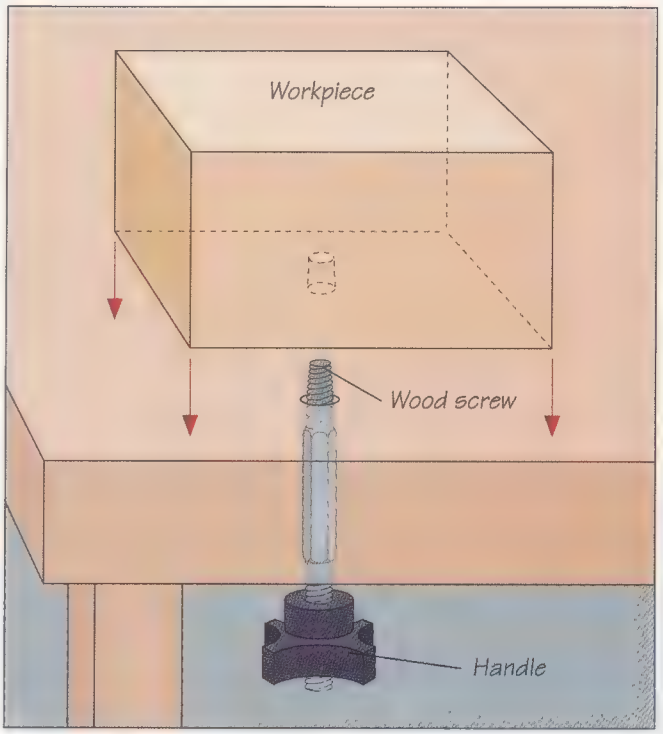

Clamping a relief carving with bench dogs

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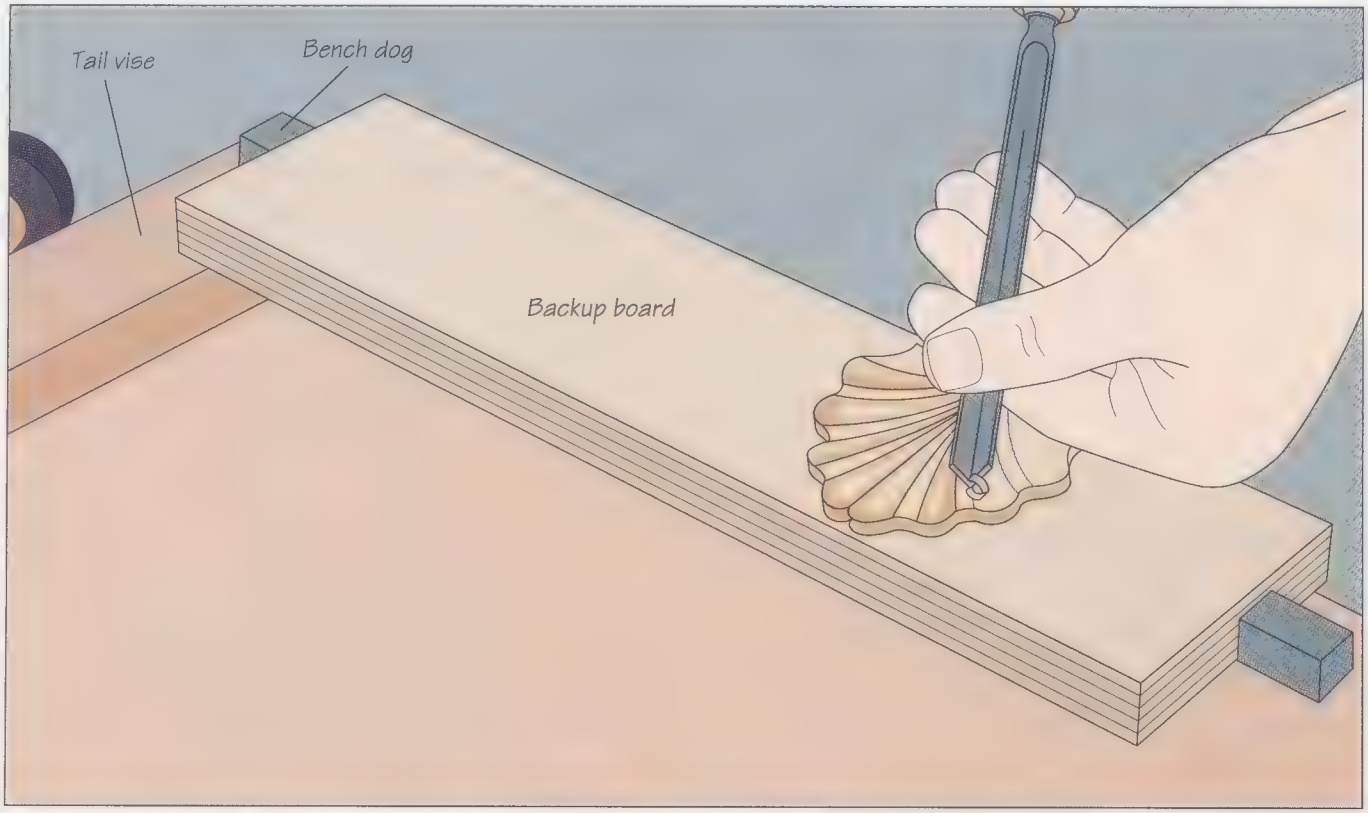
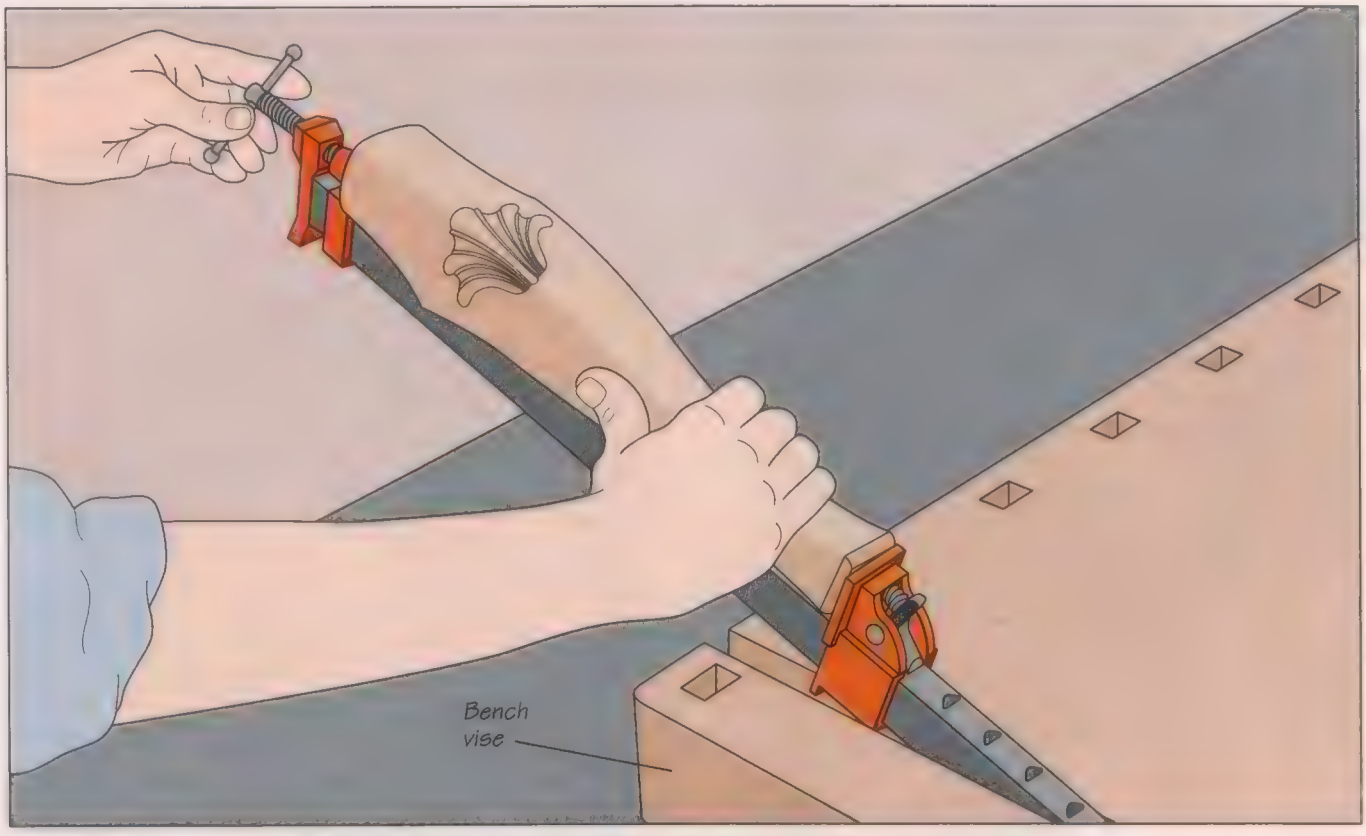
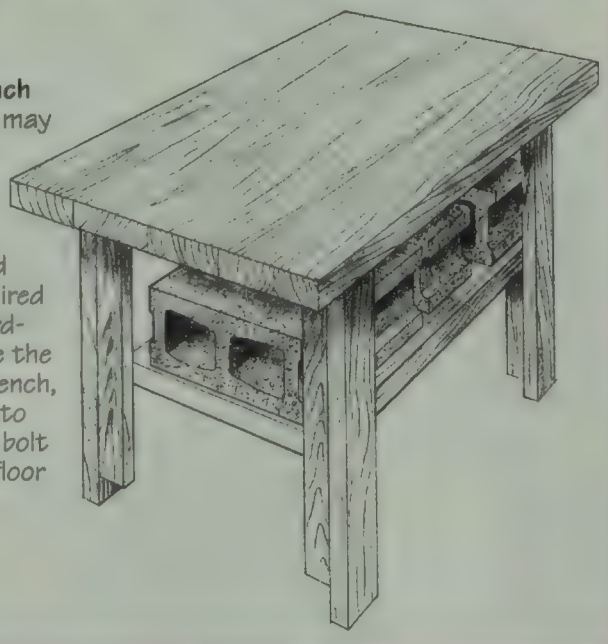




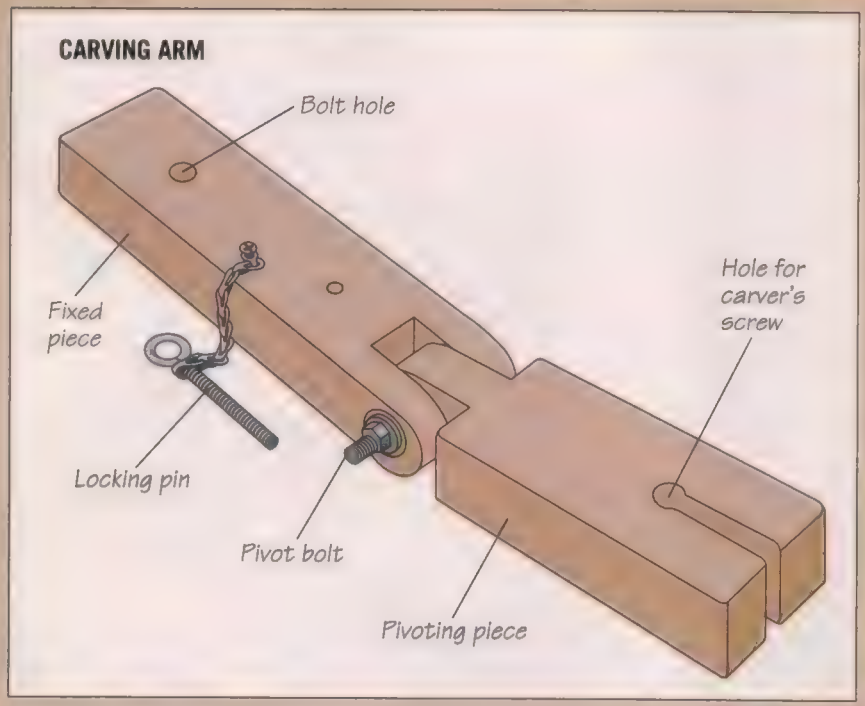
Securing irregularly shaped workpieces
To clamp awkward pieces like the cabriole leg shown above, secure them in place with a bar clamp and then install the clamp in a vise *(above)*. This will allow you to reach all the exposed surfaces of the workpiece. Rotate the leg in the clamp as necessary.

SHOP TIP

Securing your bench
A workbench that may be sturdy enough for most woodworking tasks can prove unstable when subjected to the forces required to carve some hardwoods. To increase the stability of your bench, add cinder blocks to the lower shelf, or bolt the bench to the floor of your workshop.



BUILD IT YOURSELF



TWO CLAMPING SUPPORTS FOR CARVING

Carving is much easier when you have the right clamping devices. The carving arm shown above can be pivoted to enable you to work on all parts of a carving block. The carving stand *(far right)* will allow you to secure odd shapes upright in a comfortable position. Both are secured to a workbench; both are simple to build.

The carving arm, shown in use on page 30, is made from a 24-inch-long piece of 2-by-4. Cut it in half, then saw a notch 3 inches long by 1¼ inches wide in one piece. In the other half, cut a tenon that will fit into the notch. Then round over the leading edge of the tenon so it will not rub when the pivoting piece is rotated.

Fit the tenon into the notch, then drill a ⅜-inch hole through the two pieces for a 4-inch bolt that will serve as a pivot. Bore the hole with a drill press, or use a portable drill with a try square as a guide to make sure the hole is perpendicular to the piece. Insert the bolt with washers and hand tighten it.

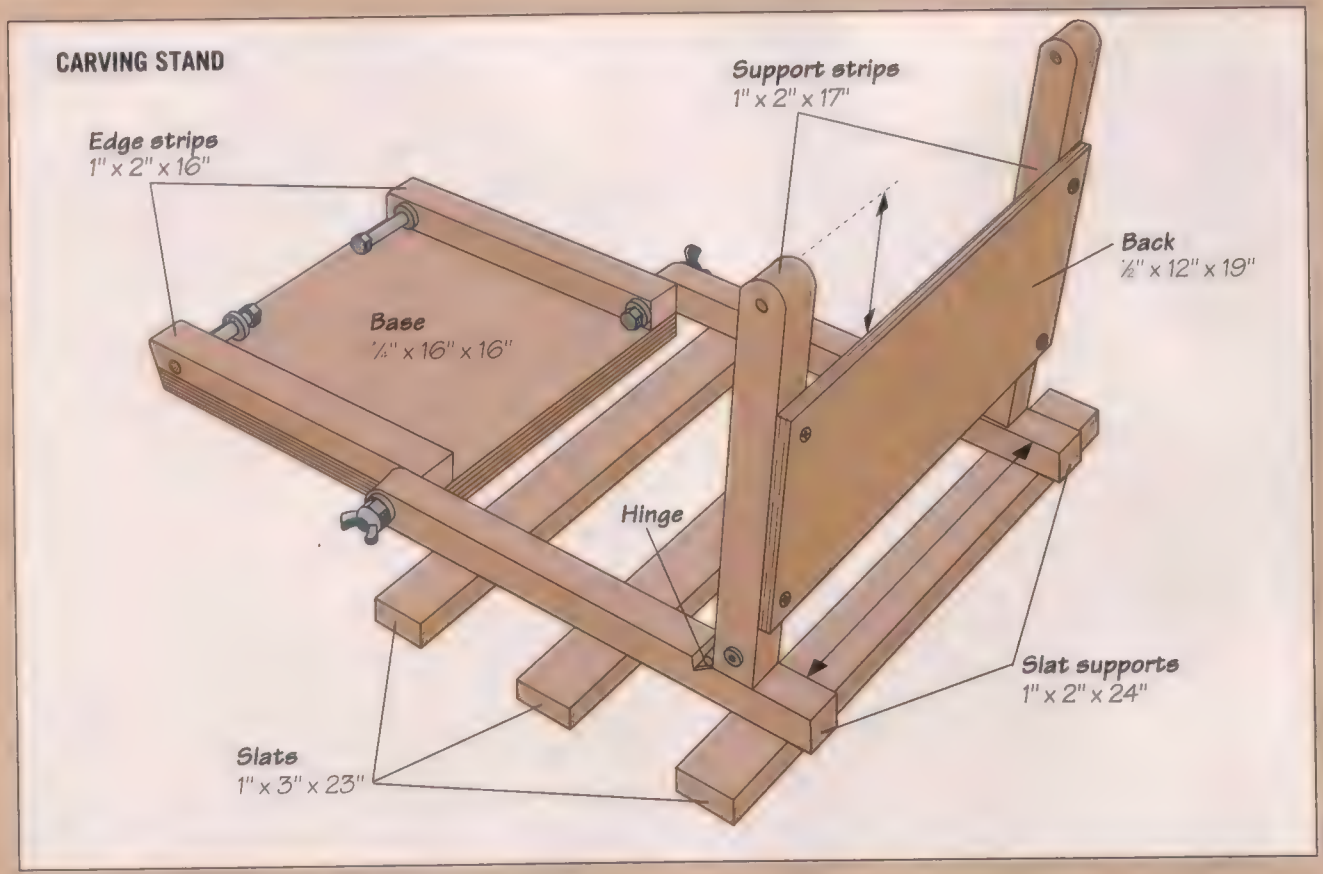
Bore two holes in the fixed piece of the jig: one for a bolt that will secure the jig to the workbench and a second one for a locking pin that will prevent the jig from rotating on the bench. Drill a hole in the pivoting piece for a carver's screw, then saw a notch from the end to the hole, as shown. The screw can be made from a large hanger bolt *(right)* having a wood screw at one end and a machine screw at the other. Get a machine shop to weld small steel rods to a suitably sized nut to serve as a handle.

To use the jig, bolt the fixed piece to your bench, then drill a hole in the bench for the locking pin and insert it. (If you do not want to drill any holes in your workbench, secure the fixed piece with two clamps.) Attach the workpiece to be carved to the carver's screw, clamp the screw in the pivoting piece, then pivot the jig to the right angle and tighten the pivot bolt securely.

It is important to carve with the workpiece upright as much as possible. If you work with your stock lying down, the change in perspective will affect how you form the work, inevitably causing distortions.

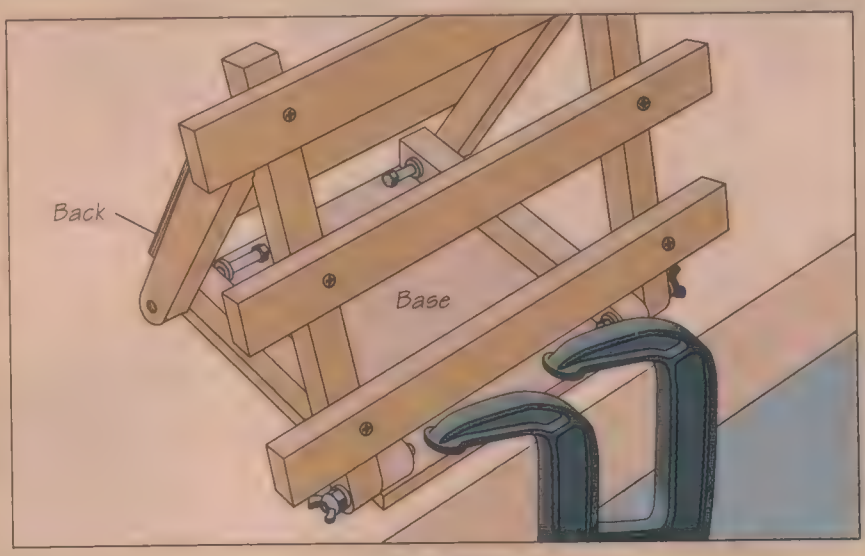
The carving stand shown opposite eliminates this problem by creating a support that keeps work upright. It is also portable, and its use of slats as a clamping surface means odd shapes are more easily clamped in place.

This jig consists of a base of ¾-inch plywood, with two strips of wood screwed flush along each edge. The back of the support is also made from ¾-inch plywood, with two pieces of 1-by-2 stock fastened to the shorter edges. The work surface consists of two slat supports, spaced 16 inches apart, onto which three slats are fastened an equal distance apart.

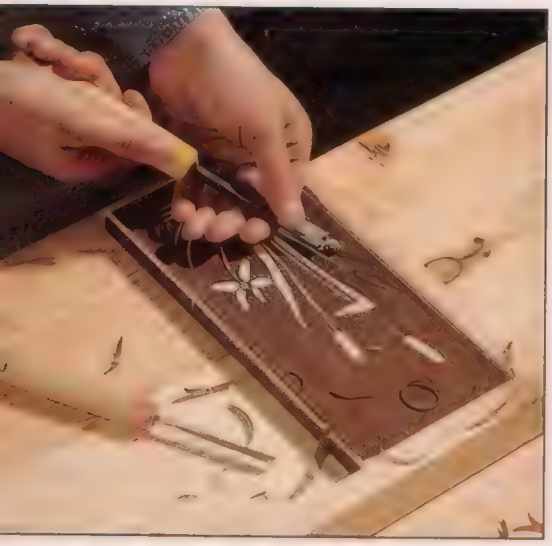


Cut a small triangular notch out of the slat supports for butt hinges to secure the supports to the support strips for the back. Install the hinges and make sure the back part pivots freely. Drill holes to join the edge strips of the base to the slat supports with ¼-inch diameter, 2½-inch-long bolts.

To use the jig, clamp the base to your workbench and secure the back support strips to the edge strips of the base with bolts. Then clamp the workpiece to one or more of the slats, as shown on page 84.



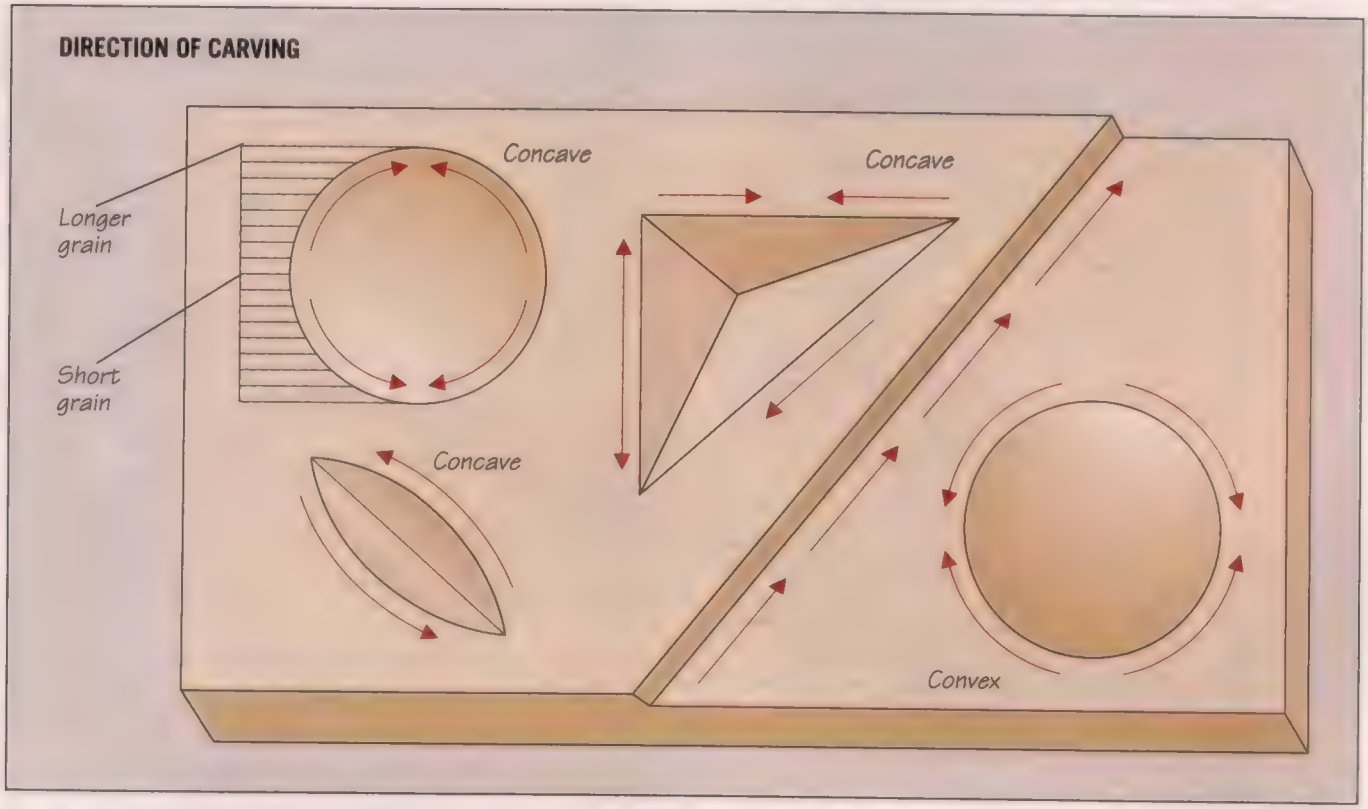
BASIC CARVING STROKES



One of the fundamentals of carving is to work with the grain rather than against it. One master carver compared the strokes to petting a dog: Moving your hand in one direction, the fur feels smooth; moving it in the opposite direction causes the fur to rise up. Similarly, when you carve, working with the grain will produce clean shavings and a smooth surface; working against the grain will cause tearout and a jagged surface. Also remember to cut so that you work from shorter grain to longer grain in the piece you want to keep, as shown in the round concave shape in the upper left of the illustration below. You can only really learn these differences by practice. Work on a piece of scrap stock and notice how the cutting action changes as you shift the position of your tool. Then try the carving exercise below.

The relief carving at left is a good practice exercise for new carvers. The techniques for making it are shown starting on page 43.

THE BASIC CARVING EXERCISE

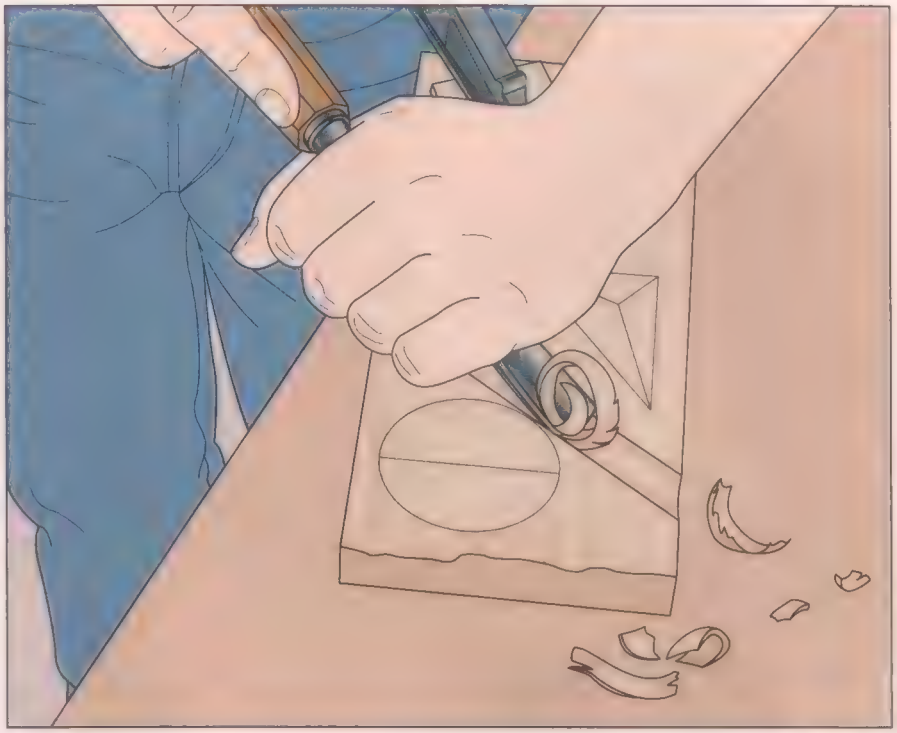


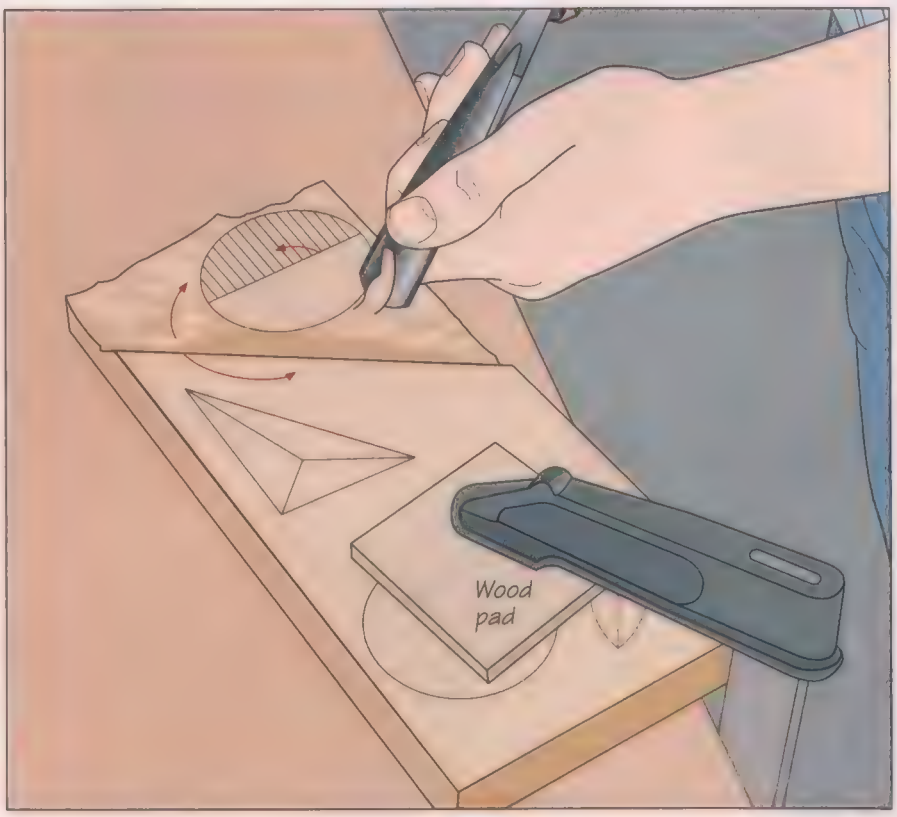
Grain direction

The exercise shown above demonstrates the direction in which your chisels must move to achieve the form. By practicing this series of exercises, you will master most of the basic carving moves. Notice how you must change direction while carving most shapes. Transfer this pattern onto a piece of basswood about 2 inches thick, 6 inches wide, and 12 inches long. The elliptical shape in the lower left-hand corner is a test of your new skills once you have attempted the other forms.

CARVING A CONVEX SHAPE

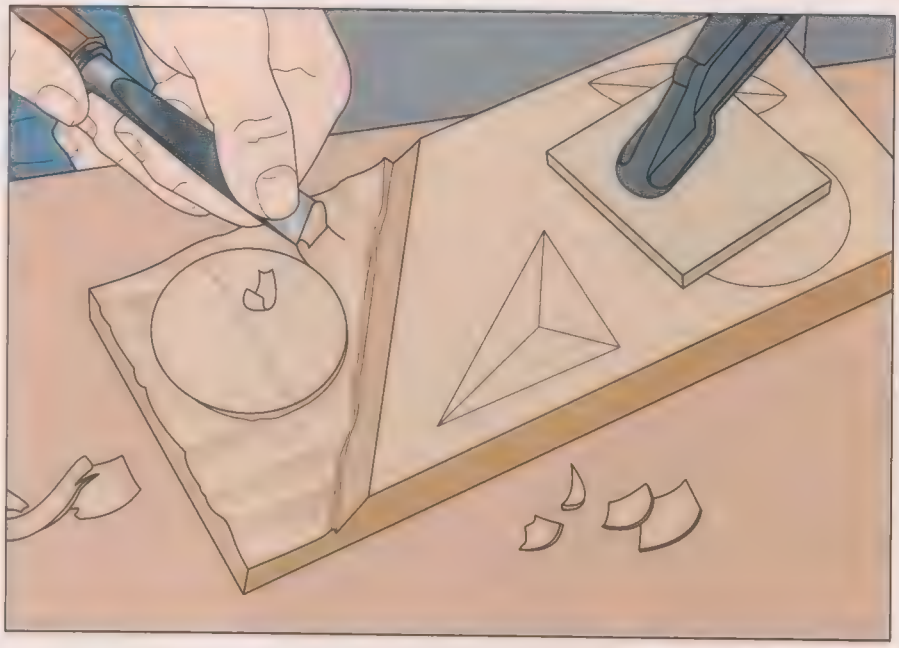
1 Terracing the surface
Clamp the workpiece to a work surface, using a wood pad to protect the stock. The first part of this exercise involves cutting a bevel diagonally across the workpiece and removing one-half inch or so of waste from the right-hand side to create a raised part that will be refined into a circular convex shape in the middle of the terraced part. Grasp a 12-millimeter No. 3 gouge with a power grip: Your left hand holds the shaft of the chisel with the palm down and the thumb near the handle, while your right hand firmly grasps the handle. Working from the shorter to the longer grain, remove the bulk of the waste from the edge of the cut *(right)*, then use a 12-millimeter No. 39 V-tool to form a clean beveled edge. Switch back to the gouge to clear away most of the waste from the terraced part, carving to within ahalf inch or so of the convex shape.





2 Defining the convex shape
Switch to a 12-millimeter No. 11 gouge and grasp the shaft of the chisel with your left hand, palm up. The gouge should rest in the crook formed by the first and second knuckle of your index finger. The remaining fingers of your left hand curl along the side of the gouge. Your thumb rests firmly on top of the shaft. Your right hand grasps the handle of the gouge with the index finger extended, and the end of the handle butted up against the heel of your palm. Carve so that you work from the shorter to the longer grain of the finished piece *(left)*. Always cut away from the desired shape toward the waste.

3 Paring out the waste
Finish clearing out the waste with a 12-millimeter No. 3 chisel. By defining the edge of the convex shape first, you can pare away the waste surrounding it without fear of chipping into the form *(right)*. Note how the edge is cut down to the final depth. This provides a guide and prevents unwanted chipping.

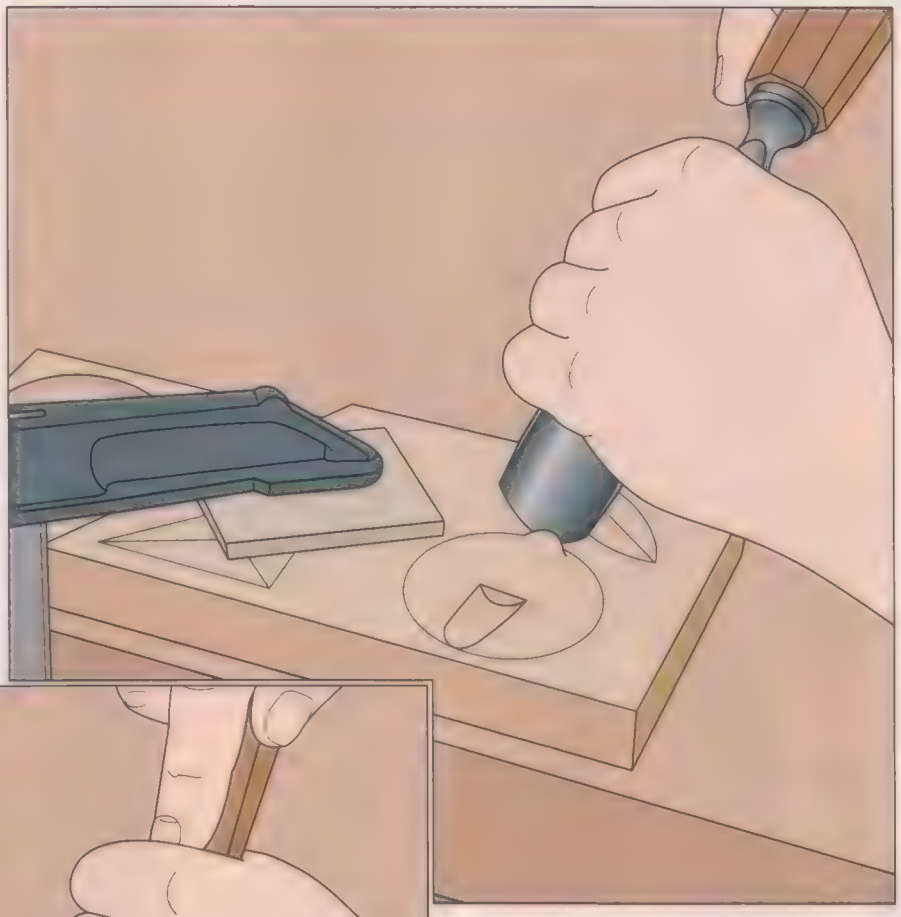


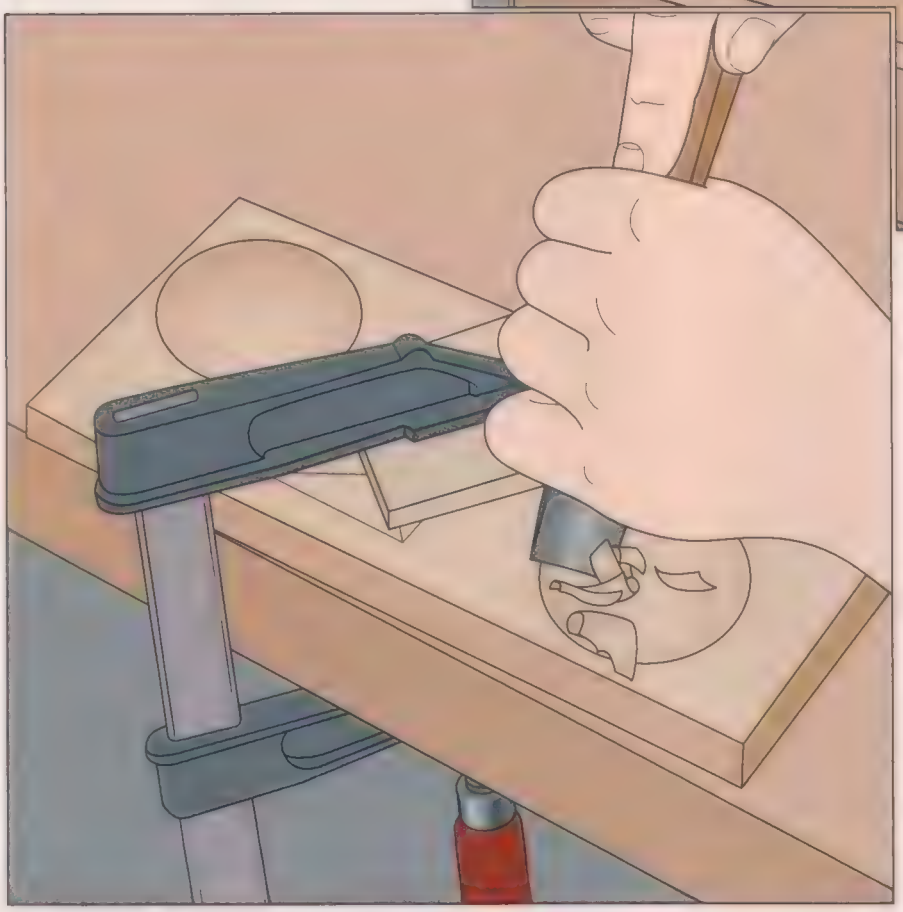
4 Rounding over the top
Use a 25-millimeter No. 3 gouge upside down to start forming the basic curvature of the surface *(above)*. Take small chips off near the top, until the curve starts to become better defined.

5 Improving the curve
Once a slight curve appears, flip the gouge right side up and carve so you produce larger chips closer to the circumference of the circle *(above)*. Continue until the curve meets the flat area around the base of the convex shape. Clean up the point where the two surfaces meet with a 4-millimeter No. 39 V-tool.

CARVING A CONCAVE-SHAPED BOWL

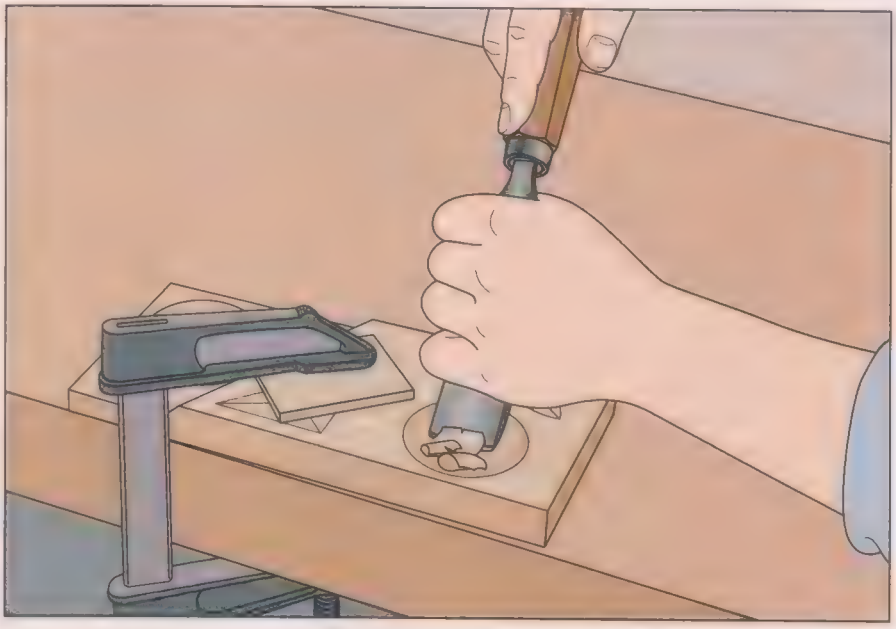
1 Cutting a center groove
Clamp the workpiece in place, with a wood pad to protect the surface. With a 25-millimeter No. 8 gouge, cut a groove across the center of the circle, perpendicular to the wood grain. This indentation will allow you to carve out the remainder of the waste more easily. Beginning at one edge, cut toward the center of the circle. Then carve the other half starting at the opposite side *(right)*. You do not need to cut the groove initially to the final depth. It is better to carve the groove to a shallower depth, then pare away the waste, as described in the next step.



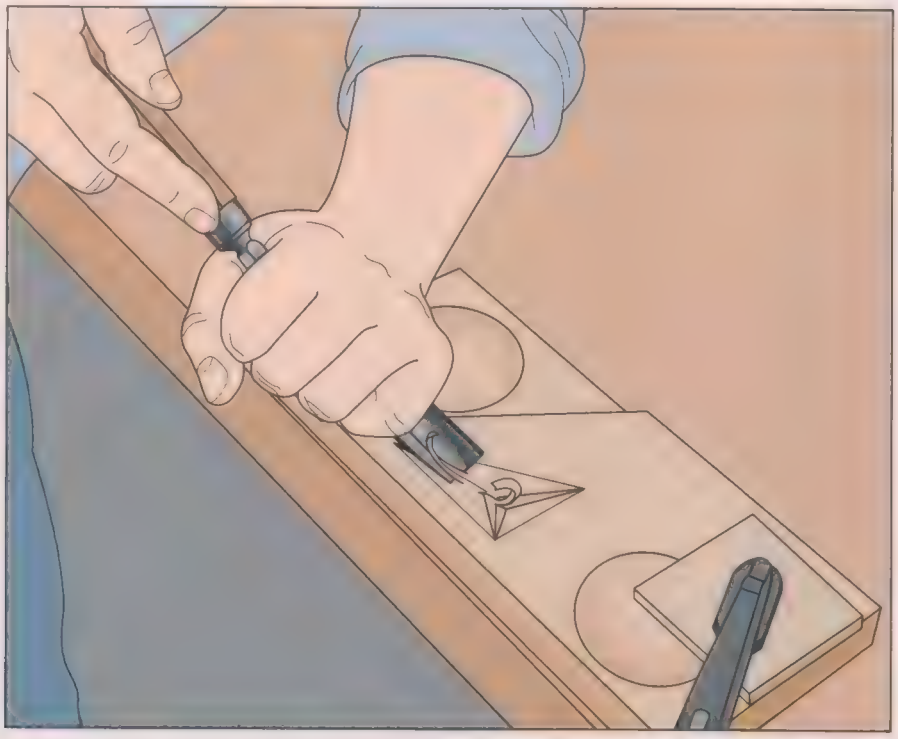


2 Carving toward the center
Working from the shorter to the longer grain *(see the illustration on page 38)*, carve a bowl-shaped depression toward the center of the circle *(left)*. Cut additional grooves across the grain and pare away the waste until the concave shape is roughed out.

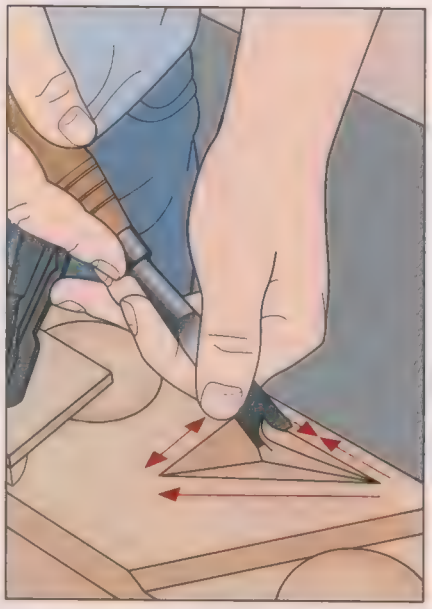
3 Smoothing out the bottom
To finish off smoothing out the bottom, carefully scoop out thin shavings of waste, working across the grain with the gouge *(right)*. Use the same grip you used to terrace the surface of the board *(page 39, step 1)*.



CARVING A CONVEX TRIANGLE



1 Carving the center grooves
As with carving the concave-shaped bowl *(page 41, step 1)*, you need to cut grooves in the center of the triangle to make it easier to remove the waste. Use a 12-millimeter No. 39 V-tool to carve a groove from each corner to the middle of the shape *(above)*.



2 Paring the waste
Switch to a 12-millimeter No. 3 chisel to carve away the waste from the edges of the form. Pay close attention to the grain, working in the direction shown in the illustration above. Make additional center grooves as necessary and continue removing the waste until you have reached the final depth and the shape is complete.

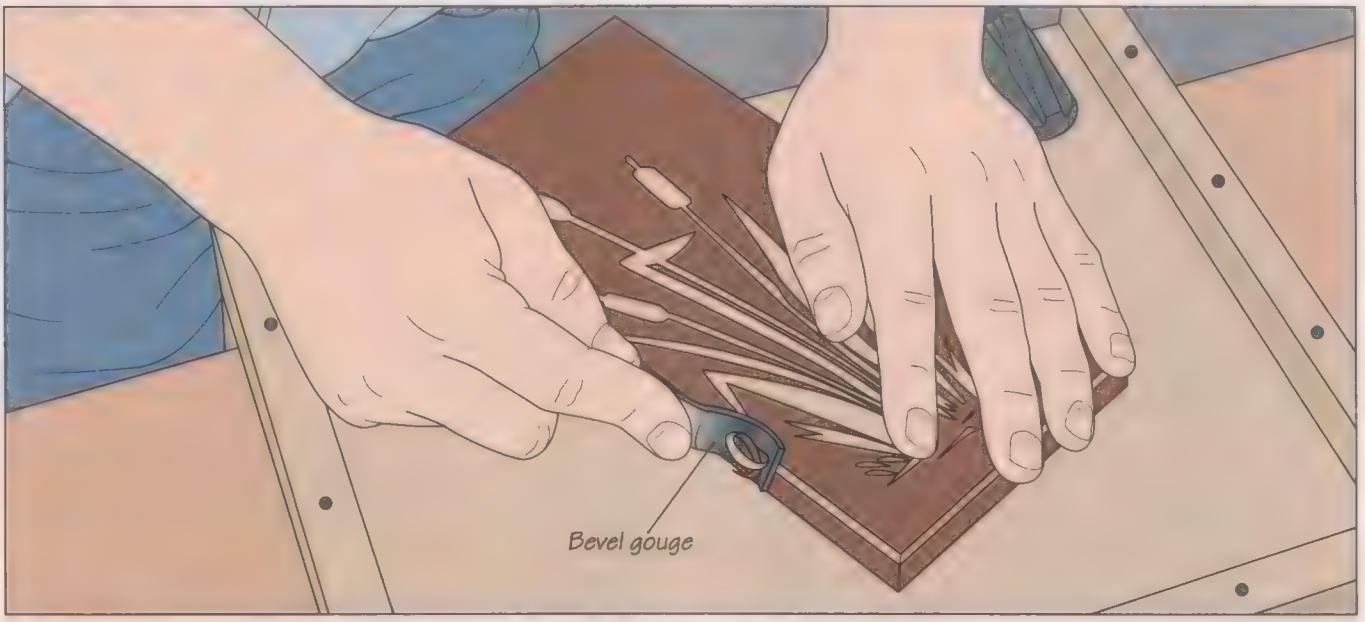
BEGINNER'S EXERCISE: CARVING A BULLRUSH SCENE

1 Carving the rushes

This exercise is designed to give you some confidence in wielding the chisels and will yield a finished carving relatively quickly. Begin by building the bench hook carving jig shown on page 53. Then apply a dark stain to a small panel of softwood such as basswood. Place the jig on the workbench with the cleat butted against the bench and clamp the device in place. Sketch a drawing of rushes on your workpiece, or transfer a design using carbon paper *(page 46)*, then set the workpiece in one corner of the jig. Use a 12-millimeter No. 39 V-tool to carve out the fine lines, revealing the light wood beneath *(left)*. The wider area, such as the leaves, can be carved with a 25-millimeter No. 3 gouge. Carve only deep enough to reveal the wood beneath the stain.

2 Beveling the edges of the frame

To create the effect of a frame, draw a bevel gouge along the edges of the workpiece. This will create a bevel of lightly colored wood, contrasting with the stained wood of the workpiece *(below)*.



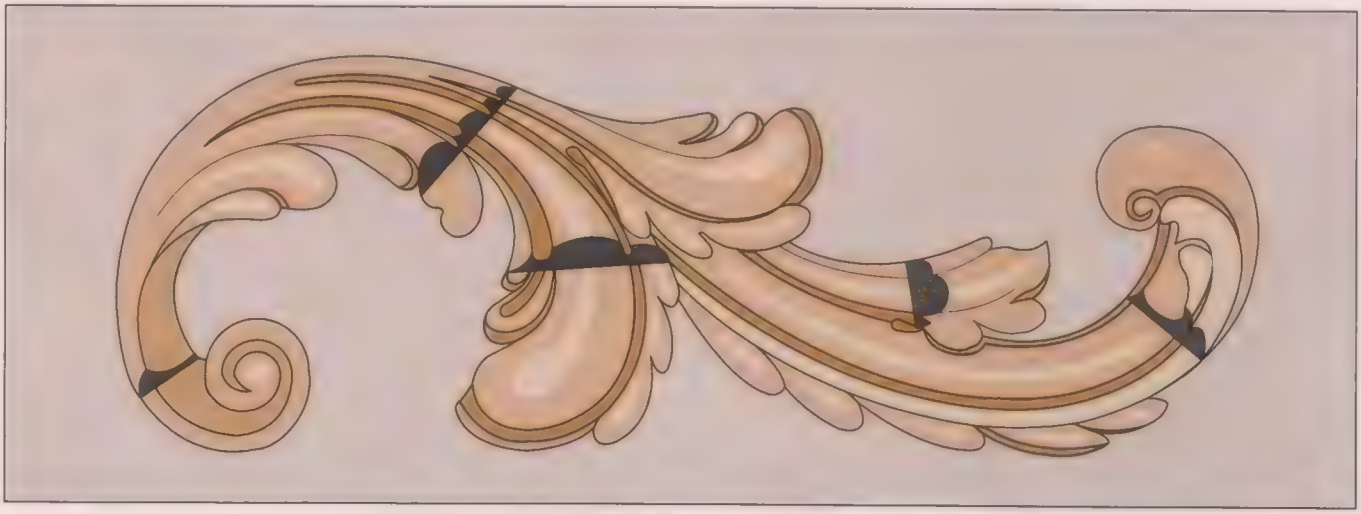
PRINCIPLES OF DESIGN

Conveying the three-dimensional nature of a carving on a two-dimensional plan is a challenge. By using such techniques as creating cross-sectional views of the piece at various points on the pattern, as shown in the illustration below, or making models from clay, you can visualize how a finished carving will look and how you should approach carving it.

A hallmark of Queen Anne, rococo and Regency furniture styles, the acanthus leaf is both an excellent design for sketching and a demanding relief carving exercise. Cross sections drawn on the sketch (below) *provide a quick visual reference when carving the leaf's overlapping lobes and serpentine curves* (above).

Before you even pick up a chisel, make sure you have a full-size pattern. If you are working with a drawing or an existing pattern, you may need to change its size. This is easily done by using a photocopier with a reduction and enlargement feature. If you do not have access to a machine or if you are working on a design larger than the biggest sheet of paper that a photocopier will accept—typically, 11 inches by 17 inches—you will need another way to enlarge or reduce your design. Two simple methods for doing this are shown on the following page. Once you have your full-size pattern you need to transfer it to your workpiece. As shown starting on page 46, there are three ways to do this. The first uses carbon paper, the second, a template, and for the third, the pattern itself is bonded to the wood.

LAYING OUT A PATTERN



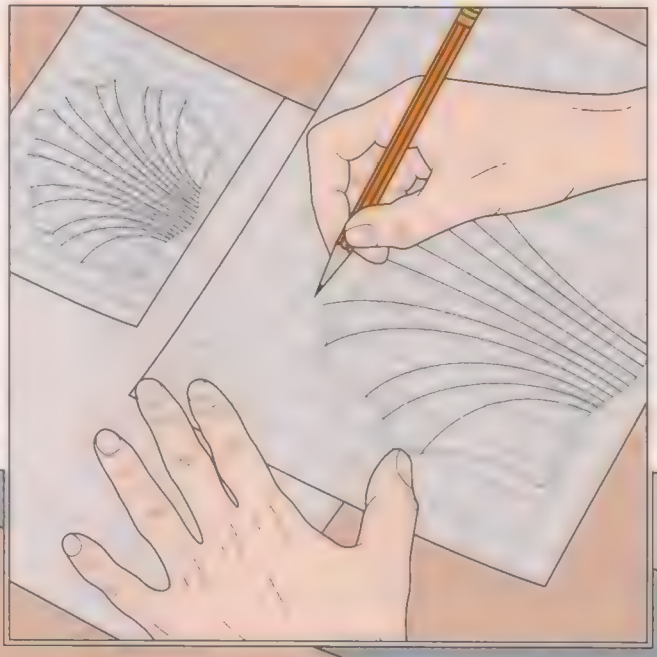
Drawing cross-sectional views

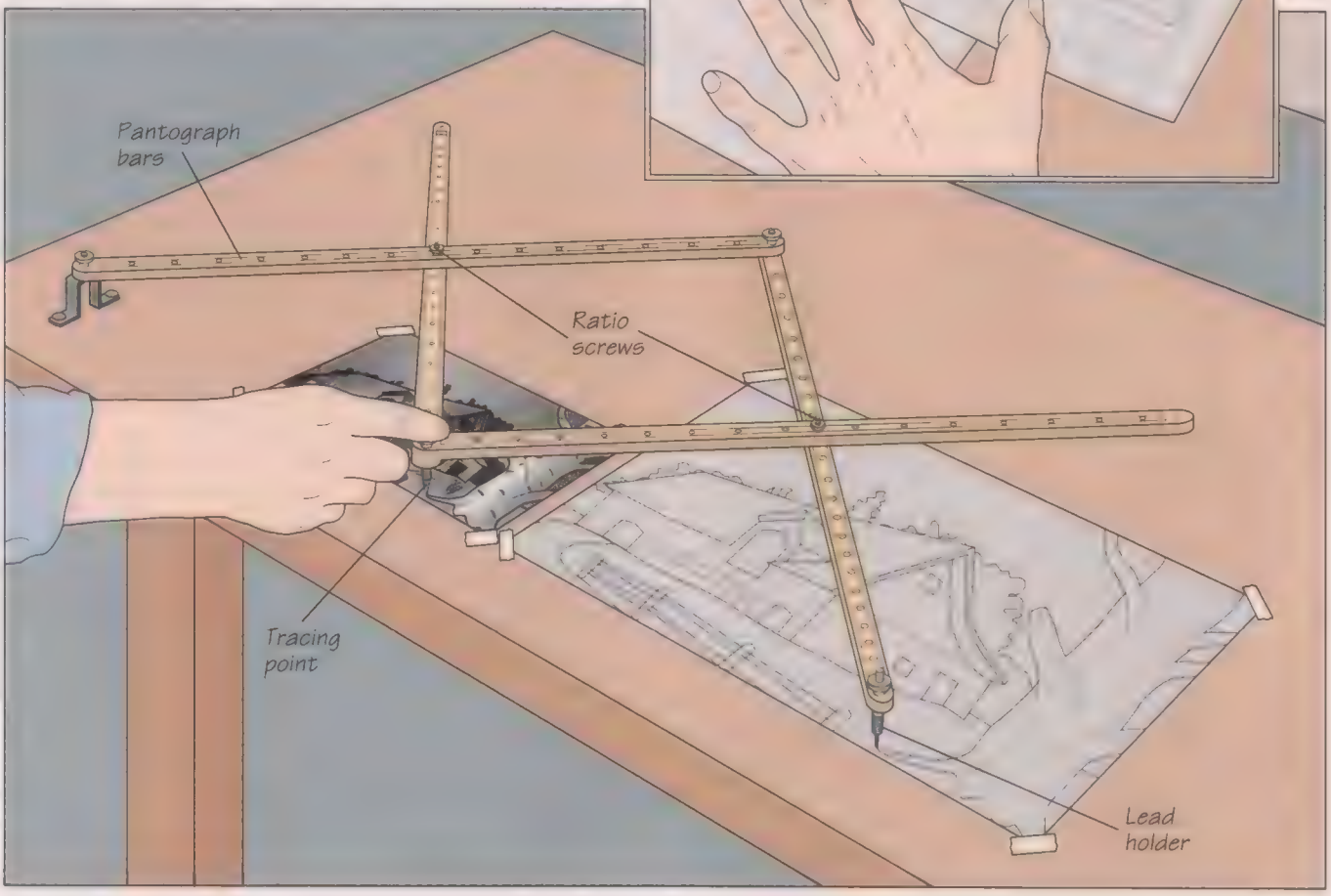
Draw a full-size design of the piece you plan to carve, including all the details you intend to include. The example shown above is an acanthus leaf, a classical Greek design that has been a favorite with carvers for centuries. Then draw cross sections at points where the shape and thickness change; these are indicated by the shaded areas in the illustration. There is no rule for doing this; the sections are simply aids. Cross-sections are invaluable at helping you conceive the shape and changing thickness of the piece, especially with a design that includes several convex and concave shapes in each cross section.

MAKING A SCALED PATTERN

Enlarging with graph paper

Draw a grid of squares over the pattern, using a ruled straightedge to make all the squares exactly the same size. The smaller you make the squares, the easier it will be to reproduce the pattern. Then, on a blank sheet of graph paper, make a larger grid, increasing the size of the square by the proportion you wish to enlarge the pattern. For example, if you need a design that is twice the size of the pattern, make the second set of squares twice as large as the first. To produce the design, draw in each square of the enlarged grid the part of the pattern that is in the corresponding square of the smaller grid *(right)*. To produce a design smaller than the original pattern, follow the same steps, but make the second grid smaller than the first one.





Re-scaling with a pantograph

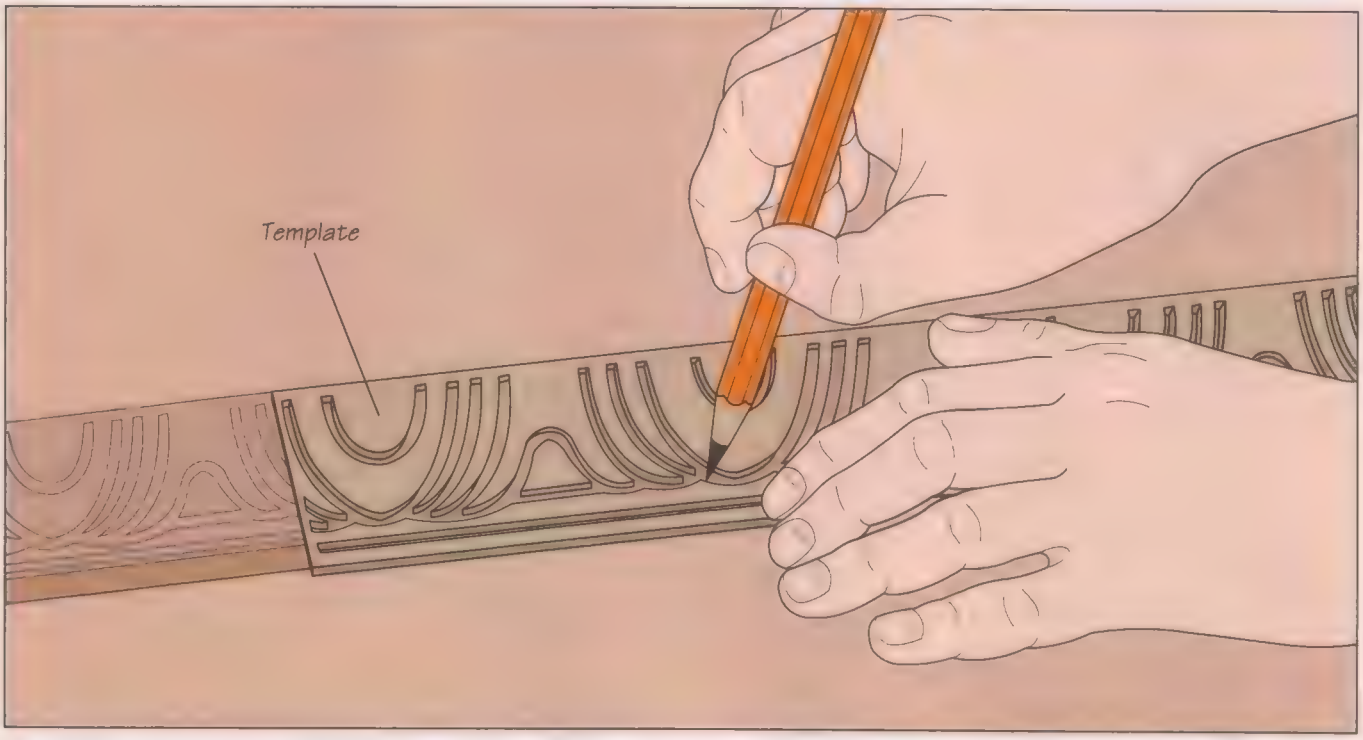
To enlarge a pattern, place the original under the tracing point and position a piece of blank drawing paper under the lead holder. Adjust the ratio screws to give the desired enlargement. (Most pantographs have the ratios marked beside the holes in the pantograph bars.) Then trace the pattern with the tracing point. The lead will make an enlarged copy on your blank paper while you trace. To reduce a pattern, reverse the positions of the tracing point and the lead, placing the original under the tracing point and the piece of blank drawing paper under the lead holder.

COPYING PATTERNS ON THE WORKPIECE

1 Transferring patterns with carbon paper
Place a piece of carbon paper on a workpiece, then tape the pattern over it, with the design in the intended position. Remember to take grain direction into consideration. For a three-dimensional carving, align delicate parts of the design parallel with the grain; this will reduce the chance of their being broken off; two-dimensional carvings with lines that run mostly in one direction should be aligned with the grain. Trace over the design with a sharp pencil *(right)*.

2 Finishing the layout
Lift the carbon paper away from the workpiece, leaving the pattern still taped. Lift the pattern and check that the design has transferred clearly *(below)*. If not, replace the carbon paper and retrace the pattern.

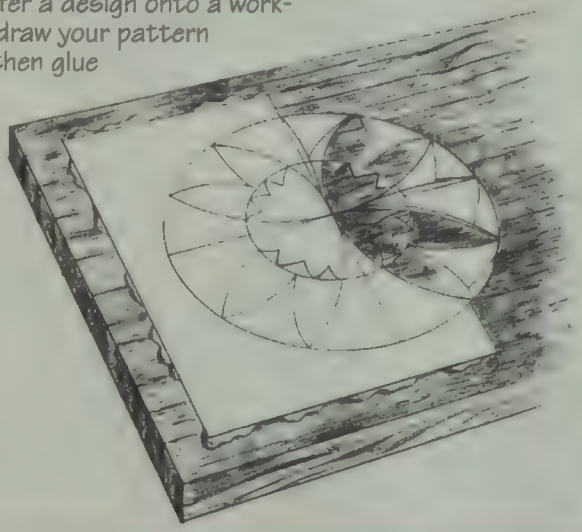
USING A TEMPLATE



Transferring a pattern using a template
If you are carving a repeating pattern, create a template from a thin sheet of cardboard. Draw the pattern on the template, then cut it out with a craft knife. Lay out the first length to be carved, and draw in the lines with a pencil. Remove the template, align the end with the part already copied, and trace the next set of guidelines *(above)* until the design is completed.

SHOP TIP

Carving through a paper pattern
With relief and chip carving, one of the easiest ways to transfer a design onto a workpiece is simply to draw your pattern on tracing paper, then glue it with rubber cement to the wood. Carve through the paper and sand away any remnants of paper after you have finished.



INCISED CARVING

One of the most striking features of European country furniture is the abundance of chip carving. Almost everything in rural homes—and often the houses themselves—are decorated with rosettes, borders, and other designs carved into the wood. Known as *kerbschnitzen* in Germany and Switzerland, it dominated interior designs thoughout Northern Europe for hundreds of years. Patterns, designs, and motifs were shared so extensively between peasant craftsmen that national styles became blurred and are now difficult to identify.

Because it is so closely associated with European peasant craftsmanship, chip carving is sometimes dismissed as relief carving's less fashionable country cousin. One look at the incredibly intricate detail on the chip-carved jewelry box shown above should quell any such delusions. It was made by renowned chip carver Wayne Barton.

To the uninitiated, chip carving *(page 50)* may seem complex, even intimidating, but it is actually a fairly straightforward process, with room for infinite variation. For the beginner, it is an excellent introduction to wood carving. You do not need to make a large investment in tools. In fact, almost all projects can be executed with an inexpensive pair of knives. The basics can be grasped in a few hours, and you will quickly learn tool control as well as techniques for keeping your knives perfectly sharp. Mastering the art can provide a satisfying challenge for a lifetime.

One of the most popular applications of the basic technique is carved borders *(page 58)*. Whether on the lid of a jewelry box or on the rim of a decorative plate, chip-carved borders provide an impressive finishing touch to many woodworking projects. Rosettes *(page 54)* offer an even greater challenge, both in laying out and carving. An enchanting combination is a rosette center surrounded by a chip-carved border, as shown in the photo on the opposite page.

You can also use incised carving for lettering and sign making *(page 62)*. While it is possible to make well-formed lettering with a router, fine details such as the serifs on Roman letters are tricky. With a bit of practice you can produce superior letters by hand—and avoid the noise, dust, and expense of a router.

Incised carving is one of the last bastions of the hand tool. It is impossible to duplicate by a machine with any degree of fidelity. Once you conquer the basics of incised carving, you will have a potent tool to add a handcrafted touch to all your woodworking projects.

One of the most popular chip-carving patterns, the rosette, has countless variations. The carving knife that is being used to cut out the design at left features a flat-sided handle, which provides better control when making angled cuts. The steps for making a rosette are shown starting on page 56.

BASIC CUTS

One of the beauties of chip carving is the economy of tools required. A couple of good knives and perhaps a V-tool can get you through most projects.

The three- and six-cut triangles are the basis of chip carving. Though a very simple form, they should not be undervalued. European craftsmen have used chip carving for decorating all sorts of household objects for over a thousand years.

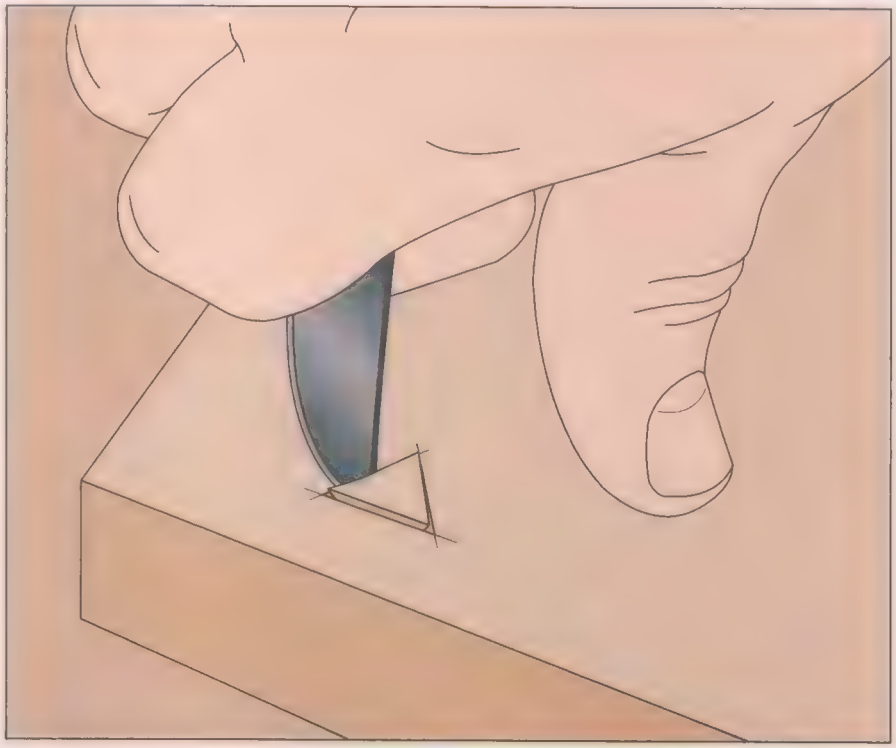
Usually the sides of a chip are cut at an angle of about 65°. But they are sometimes made even steeper. In a triangular chip this can cast a longer shadow giving the illusion of a deeper chip. The chips do not have to be very deep. For most projects, ⅛ inch is adequate. In fact anything deeper than ¼ inch makes carving much more difficult and looks unattractive.

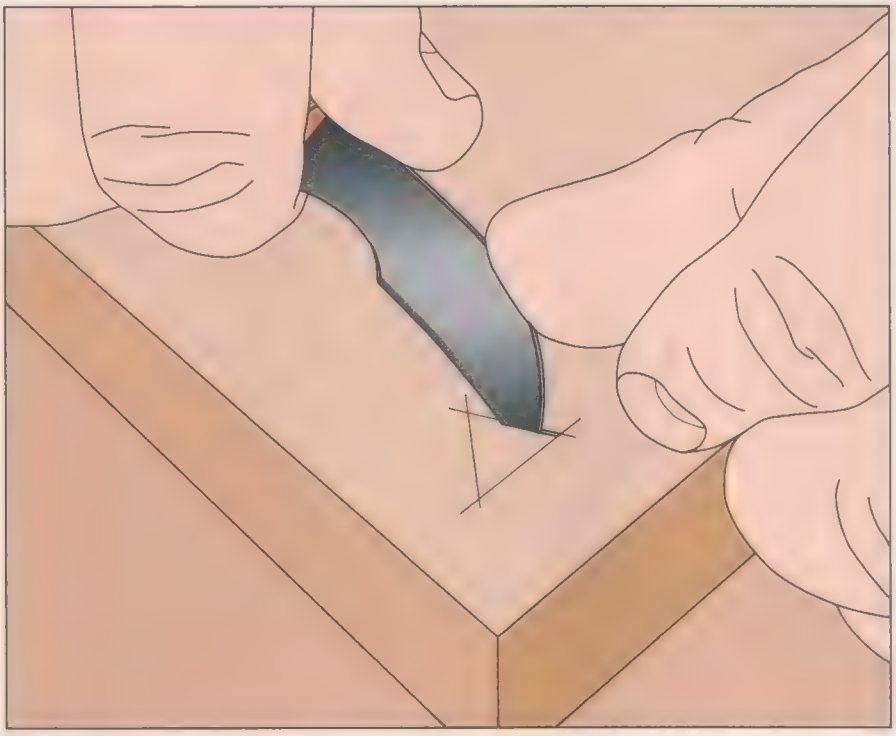
It is crucial that the knife have a straight, razor sharp blade. For best results, hone the blade at an angle of about 10° on a 4000 or harder stone then strop it on a leather strop. For more information about sharpening your knives, see page 22.

THREE-CUT TRIANGLE

1 Cutting the first two sides

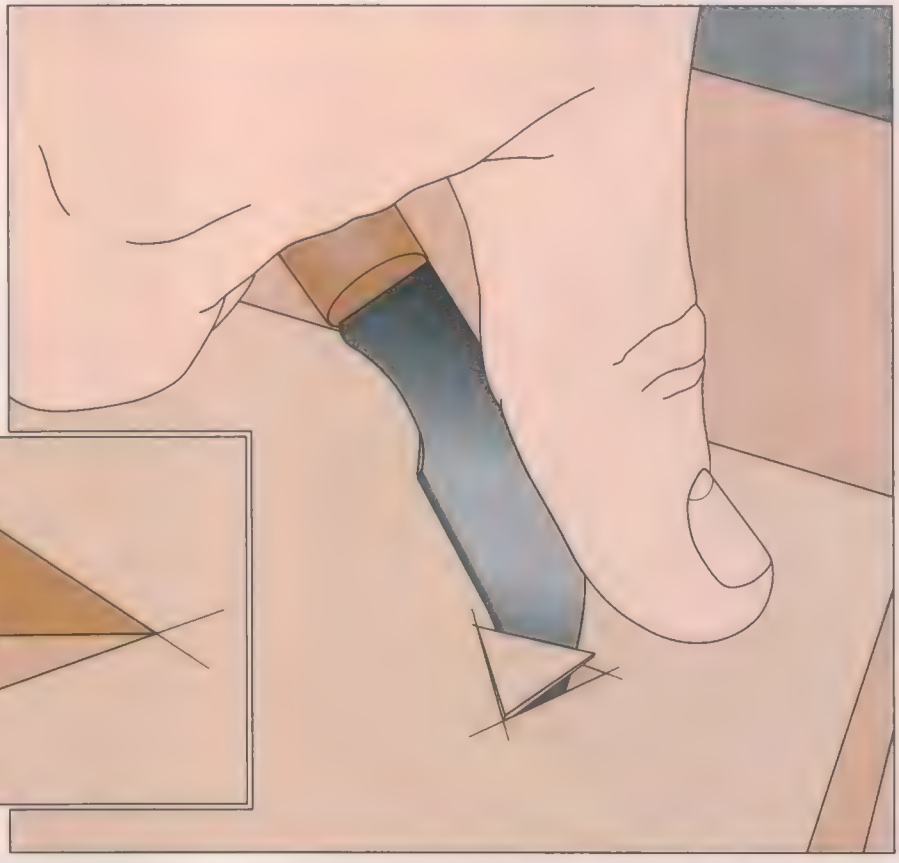
The first and second cuts are called stop cuts. To make this cut, hold the knife and position it as shown, setting the point in the far corner of the marked-out triangle. Pull the blade along the line, increasing the depth as you go to the middle *(right)* and then easing the blade out of the wood. Use your whole arm to make the cut. Do not pull the knife toward your thumb like you are peeling a potato; this can result in a nasty cut. Many carvers hold their knife with the lower part of their thumb pressed against the handle to prevent this hazard.



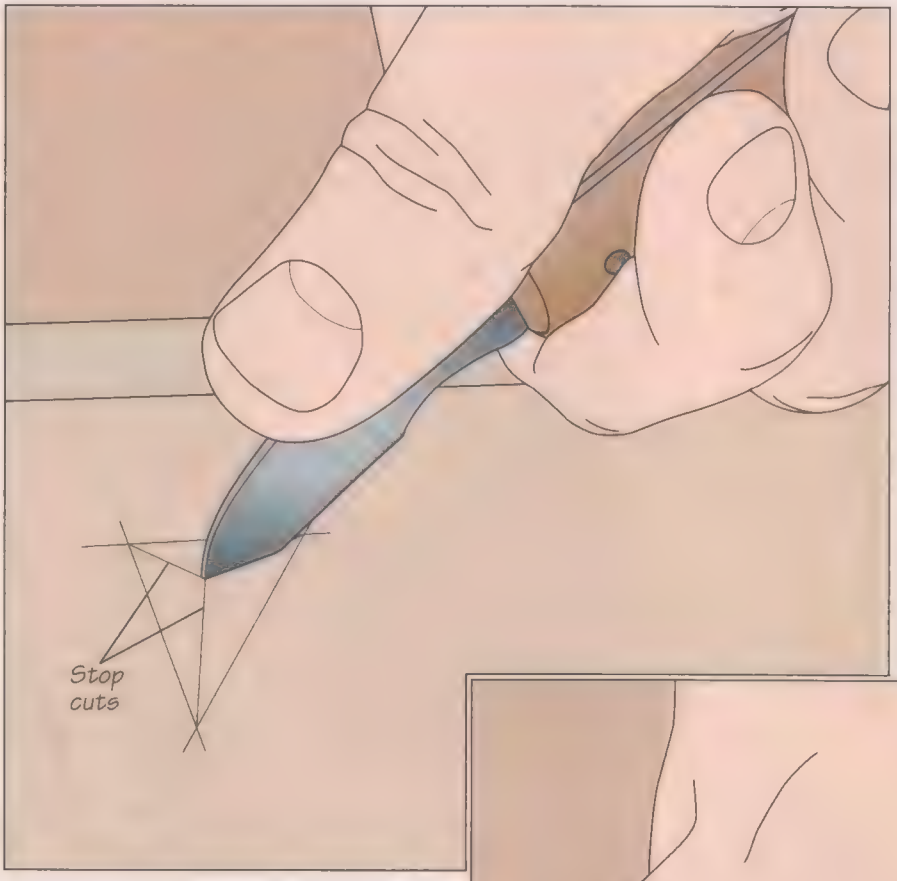


2 An alternative method
Cuts that parallel the grain can be difficult, since the blade tends to wander off track. For maximum control, some carvers push the blade into the wood, using their second hand to guide the cut *(left)*, while others use the same pulling stroke as shown in step 1. Experiment on a piece of scrap wood to learn which method is most comfortable for you.

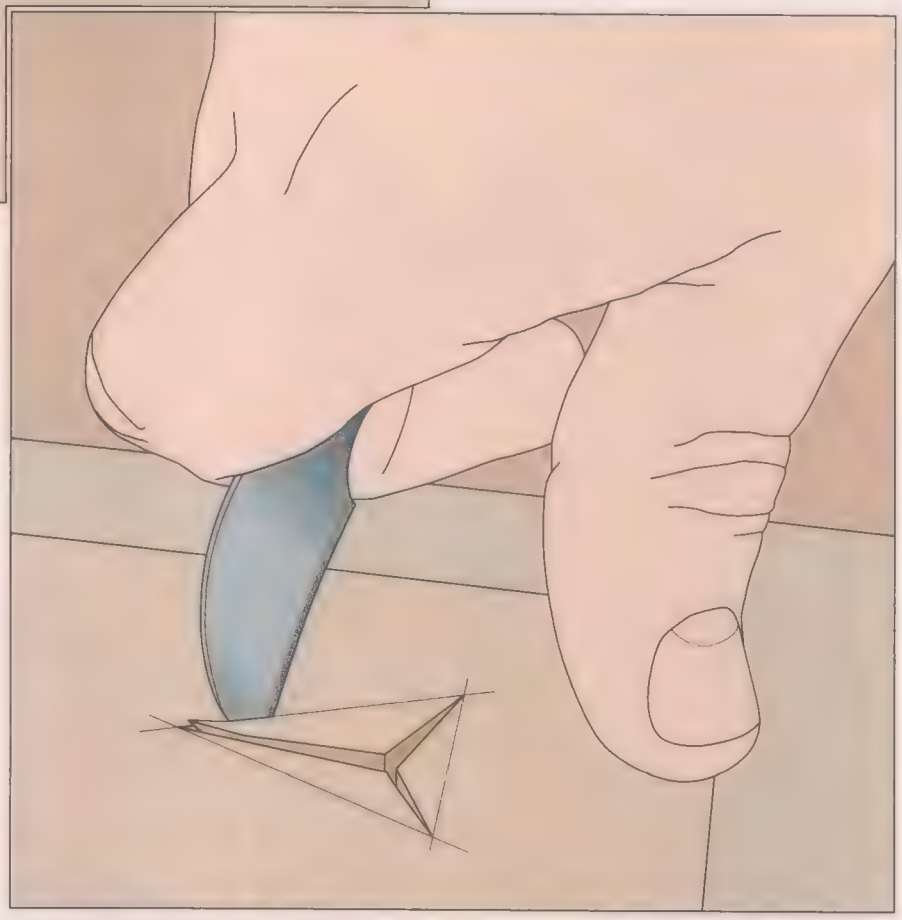
3 Making the final cut
The final cut cleans out the waste and is always made at an angle. For this, imagine where the stop cuts on the other two faces ended and angle the knife to meet them. With practice you will get a feel for this. To make the cut, hold the blade at the correct angle with the tip in the far corner. When you meet the stop cuts, the waste should pop free as a tiny pyramid-shaped piece of wood *(inset)*. Do not try to cut too deeply; ⅛ inch or so at the deepest point should suffice to free the waste.



SIX-CUT TRIANGLE

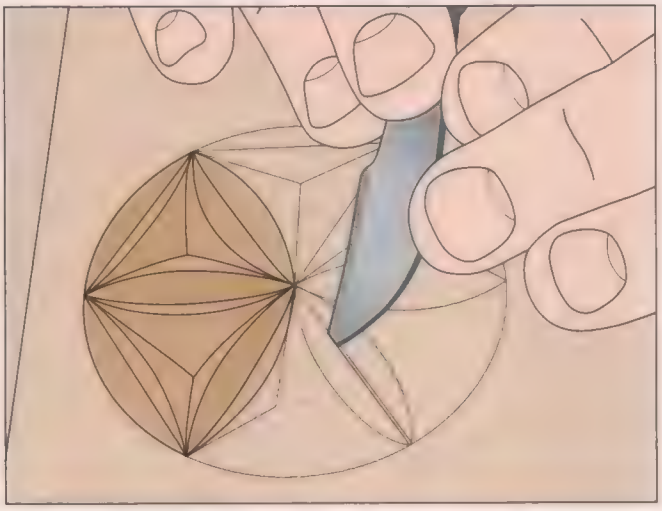


1 Making the stop cuts
The six-cut triangle is generally used to form larger triangles. Three stop cuts are made, then the waste is removed in three small triangles. First draw the triangle, then decide where the deepest part of the cut should be—normally at the center. Draw lines from this point to each of the three corners. To make the stop cuts, position the tip of the knife on the intersection and align the blade over one of the marked lines. Push the knife into the wood to the correct depth, then pull it toward the corner *(left)*, decreasing the depth evenly as you go. At the corner, the blade should be at surface level. Repeat for each line.



2 Removing the waste
The stop cuts divide the triangle into three smaller triangles. Remove each of them separately using the same technique for removing the waste of a three-cut triangle *(page 51, step 3)*. To make the cut, slide the knife along the line, pushing the tip in deep enough to meet the stop cuts *(right)*. Depending on the size of the cut and the angle, you may want to hold the knife as shown here, or in step 2 on page 51. Again, do not cut too deeply; ⅛ inch or so at the deepest point is about right.

CURVED CUTS



1 Making the stop cuts
As with six-cut triangles, most curved cuts require that you first make a stop cut to the correct maximum depth. In the example shown—a rosette petal—the stop cut is made down the center of the object. Start at one end of the shape and pull the knife along the line *(above)*. Increase and lessen freehand pressure as needed to control depth. In this case, the cut starts at zero, reaches maximum depth in the middle, then rises back to surface level.

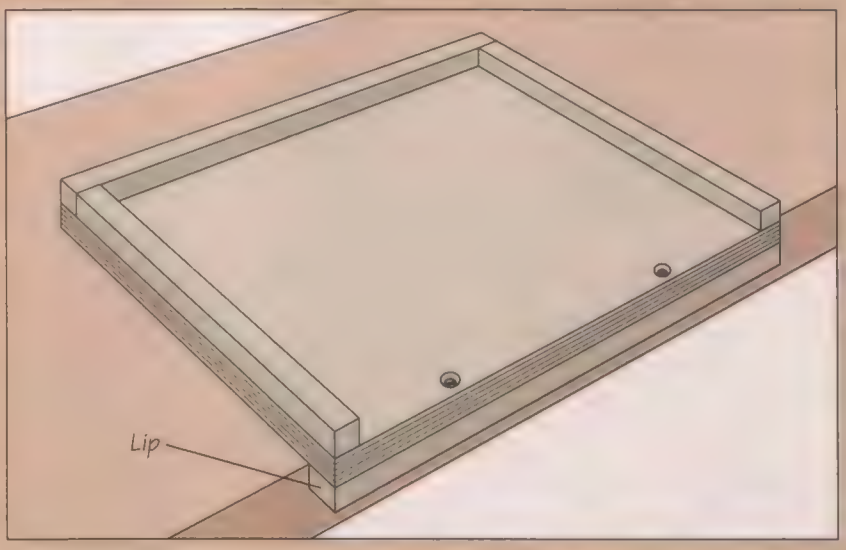
2 Removing the waste
Remove the waste from a curved cut much as you would from any other chip-carved shape. The knife must slice into the wood at the correct angle so the tip meets the lower limit of the stop cuts, freeing the waste piece. To make the cut, position the blade tip at the point of the shape then move it along the line. Use your knife hand to control the angle and twist of the blade. Use your thumb to control the depth and to move the cutting edge. The visible part of the blade should stay on the line while the tip cuts along the bottom of the stop cut. With practice, you will acquire the feel to tell where the blade tip is.

BUILD IT YOURSELF

A BENCH HOOK JIG

Chip carving requires you to be constantly moving and turning the board to get the right angle. This makes it impractical to clamp the stock. One simple solution is to use a shop-built bench hook. As long as you cut away from yourself, it will hold the carving in place.

To make the device, fasten some ¾-inch-square stock to three edges of a piece of ¾-inch plywood 12 inches square. Next screw a length of ¾-by-1-inch stock to the underside of the board flush with the front edge. This will serve as a lip to keep the jig in place.



ROSETTES

A compass is used to create, then divide a circle, the foundation of every rosette. European peasants could easily improvise a compass with a couple nails and a piece of string.

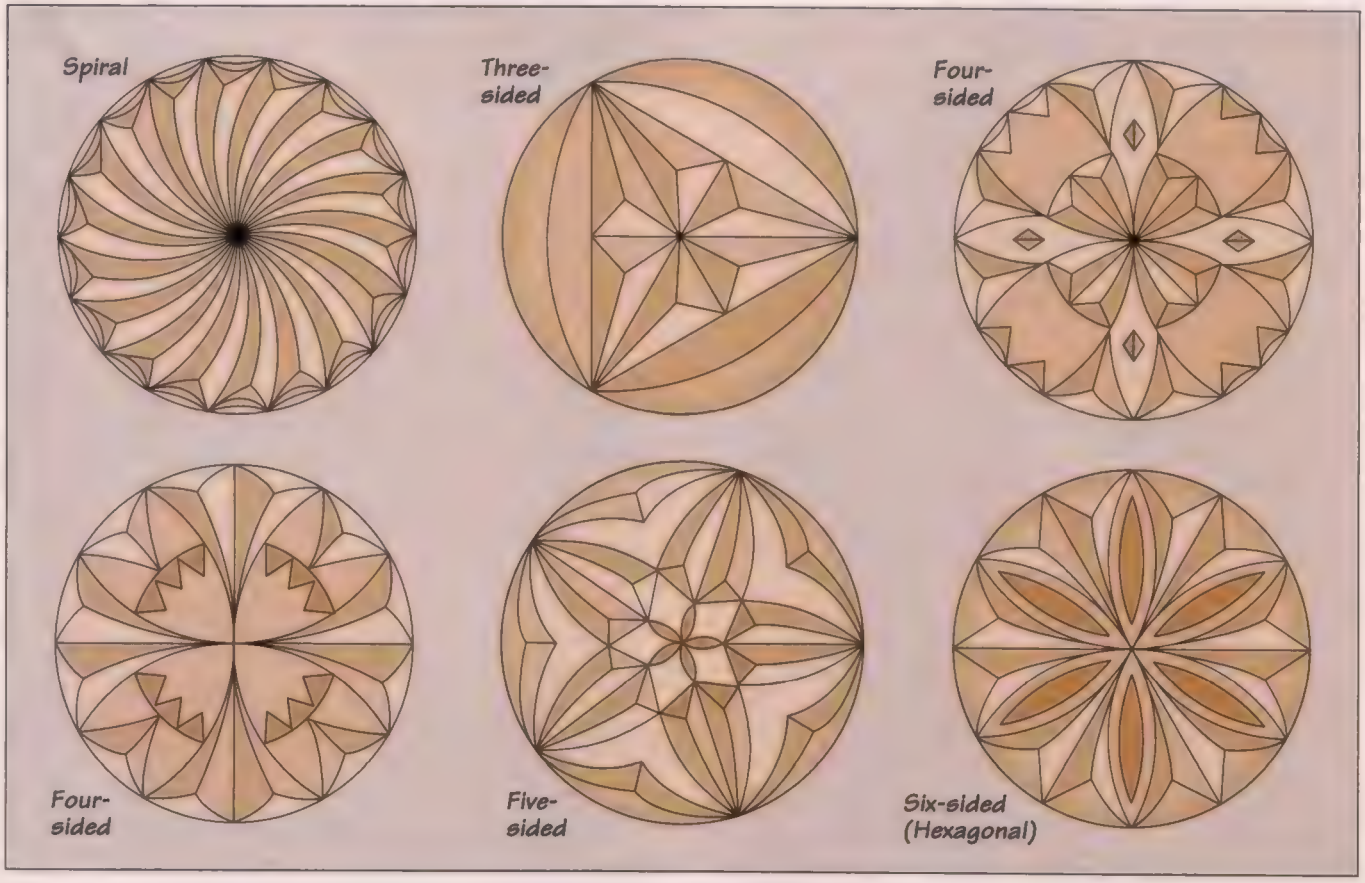
The rosette is an ancient pattern dating back to pre-Christian Europe, with symbolic meaning that has been obscured by time. The popularity of the design betrays its importance, however. The rosette was the classic motif of European peasant furniture, found not only on furniture, but also carved on doorways for good luck.

The gallery below shows six typical rosette designs. You can enlarge them to whatever size you need or you can create your own designs. The drawing of all rosettes starts with plotting a circle, which is then divided into a number of equal sections or sides.

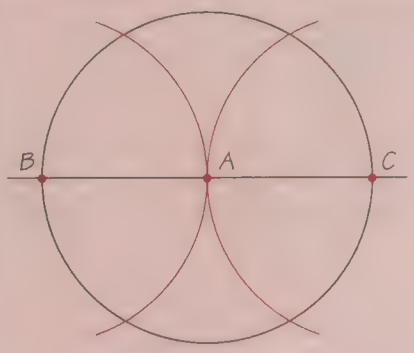
The techniques for sketching hexagonal and 12-sided spiral rosettes are shown on the following page. Sketch the designs on paper, then experiment with different details before marking up the carving.

There are two versions of most designs depending on what part is removed. For example, the procedure on pages 56 and 57 shows removing the petals to lower their pattern. But you could also choose to cut away the opposite material and leave the flower raised. The two could also be combined. The only limit to the designs you create is your own imagination.

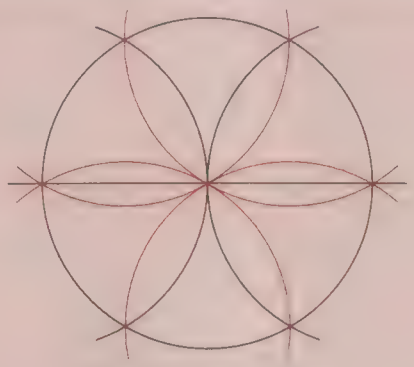
GALLERY OF ROSETTE DESIGNS



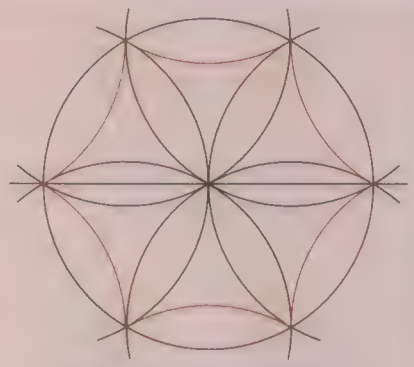
SKETCHING A HEXAGONAL ROSETTE



1-Draw a circle around point A, then two semicircles centered at B and C with the same compass setting.

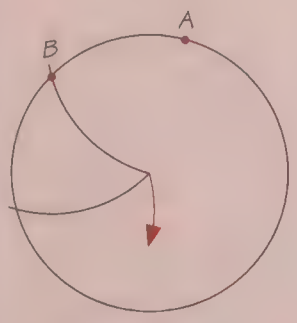


2-Centering the compass on each of the six intersections, draw a semicircle (shown in red).

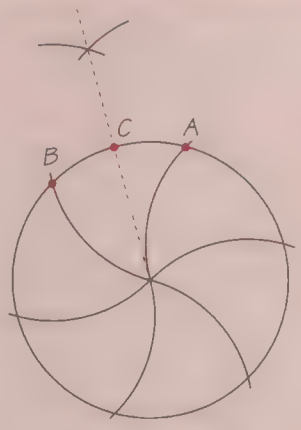


3-Draw outer arcs (shown in red) freehand, then draw lines (shown in yellow) connecting opposite intersections on the circumference.

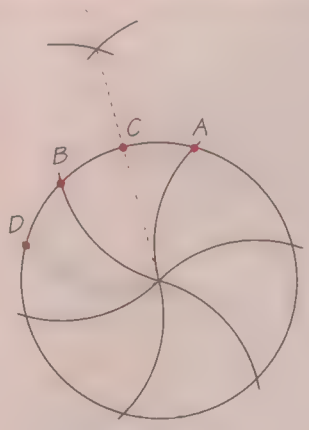
PLOTTING A TWELVE-SIDED SPIRAL



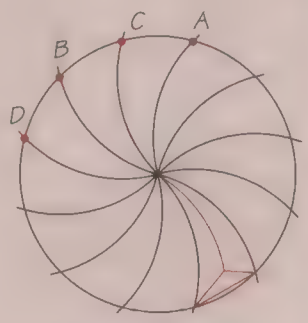
1-Draw a circle of the correct radius. With the same compass setting, place the point anywhere on the circle—say A—and draw an arc from the center to the circle. Place the point where the arc intersects the circle—B—and draw the next arc. Continue until you have drawn six arcs.



2-Place the compass point on A and draw an arc outside the circle. Draw a similar arc with the point resting on B, intersecting the first arc. Connect the intersection to the center of the circle (shown as a dotted line in the illustration above), bisecting the arc AB at C.

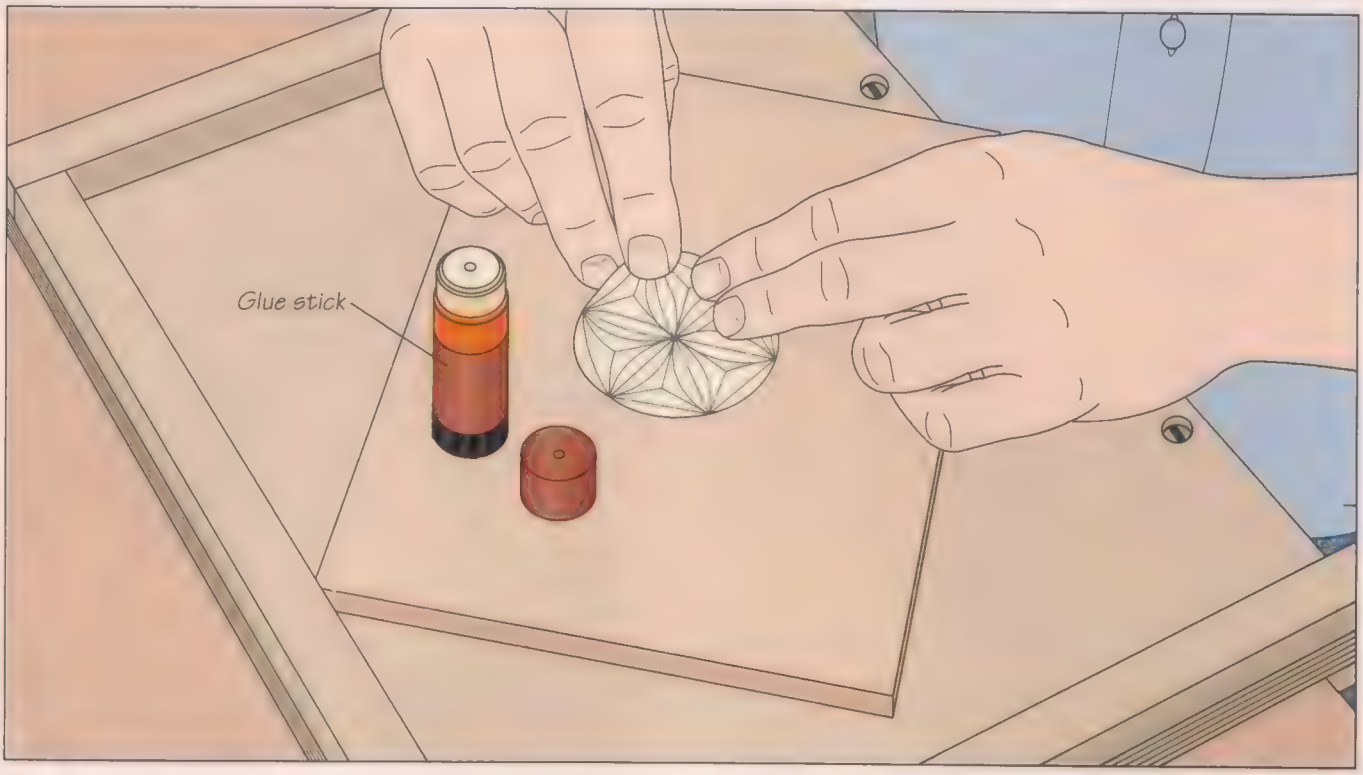


3-Place the compass point on C and draw an arc (shown in blue) from the center to the circumference of the circle. Draw another arc (shown in yellow) using the intersection of the previous arc and the circumference of the circle—D—as the center. Continue in this manner until you have a total of six more arcs, dividing the circle into 12 equal parts.



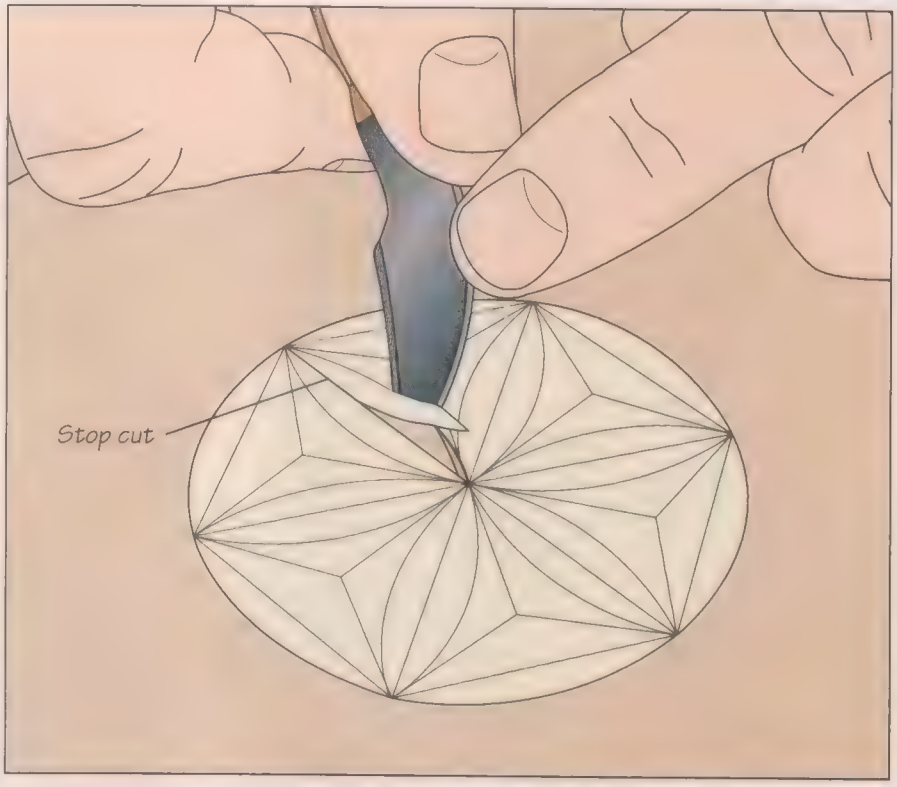
4-Divide each of the 12 sections into three sections as shown by the red lines in the illustration above. The easiest way to do this is freehand.

CARVING A HEXAGONAL ROSETTE



1 Attaching the pattern

Draw or photocopy the design onto a sheet of paper and trim away the excess. Mark the workpiece to show exactly where you want the pattern to go. Apply adhesive to the marked area with a glue stick. To attach the pattern accurately, line up one edge with the marked area, then roll the pattern onto the workpiece *(above)*.

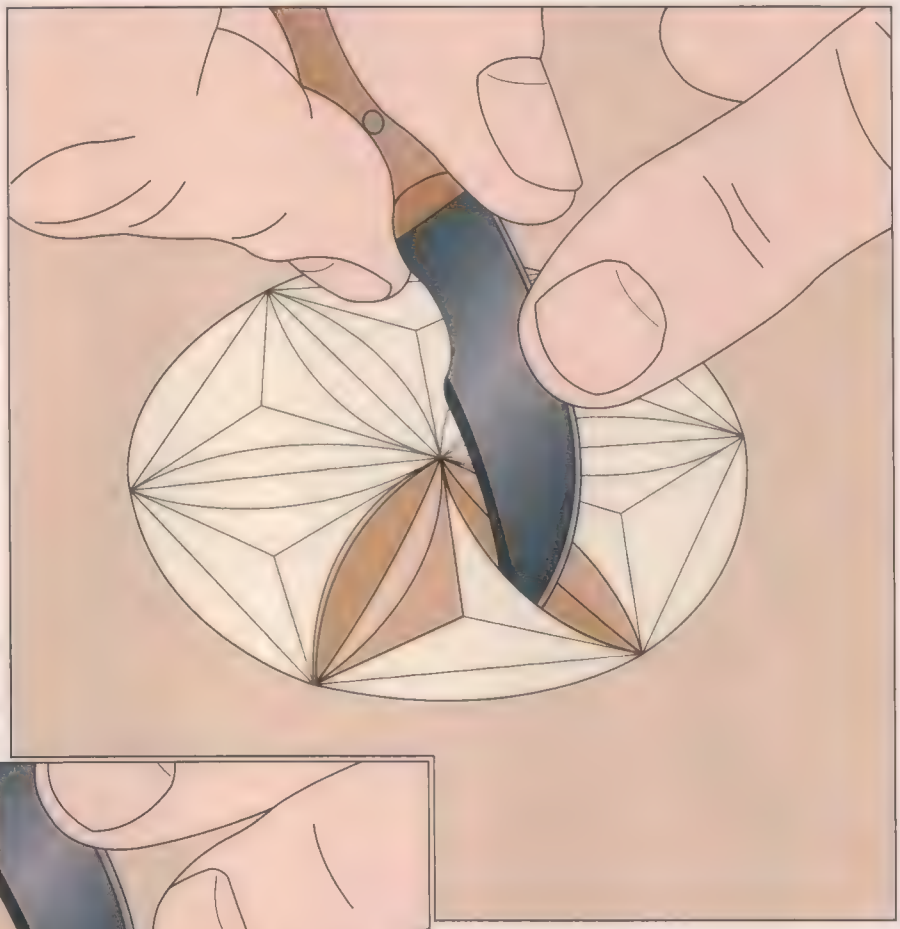


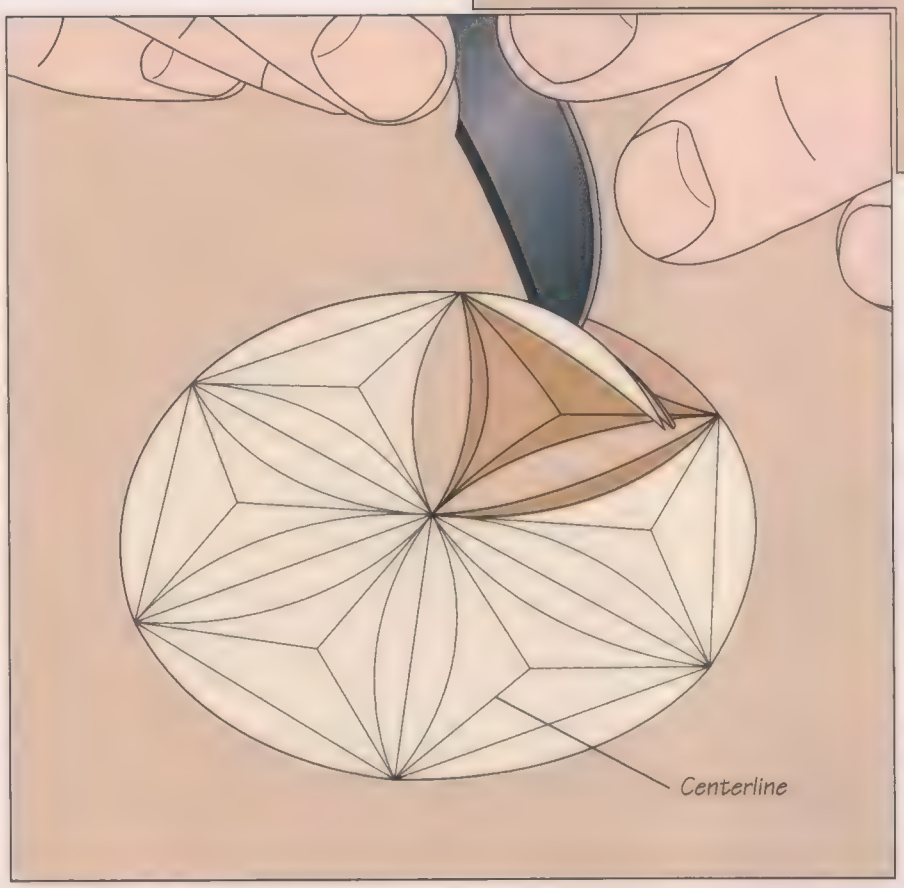
2 Removing the petals

The petal waste can be removed using the curved cutting techniques shown on page 53. Cut out each petal in two sections. First, make a vertical stop cut down the center, smoothly varying the depth from zero at the tips to 3/16 inch in the center in a smooth curve. Then remove each half with an angled cut. Use your knife hand to control the depth and twist of the blade, while the free hand pushes it through the wood *(right)*. Keep the heel of your hand on the workpiece to steady the cut.

3 Cutting the triangles

Each of the triangles is basically a six-cut triangle *(page 52)* with two curved edges. Make a stop cut along each of the central lines of the triangle. Work from the center out, going from a depth of about 3/16 inch to zero at the corner. Remove the waste by sliding the knife along the curved line *(right)*. Be sure to hold the blade at the correct angle so it meets the bottom of the stop cuts.





4 Cutting out the edge section

The outer arcs that form the perimeter of the rosette are basically half-petals and can be cut out using the same technique. Make a vertical cut along the straight edge, varying the depth as in step 2. Next, remove the waste with an angled cut along the circle that intersects the stop cut. The chip should pop free *(left)*. Then repeat steps 2 to 4 for the five remaining parts of the rosette. Finally, peel off the remaining paper and sand away any residue with 220-grit sandpaper wrapped around a block.

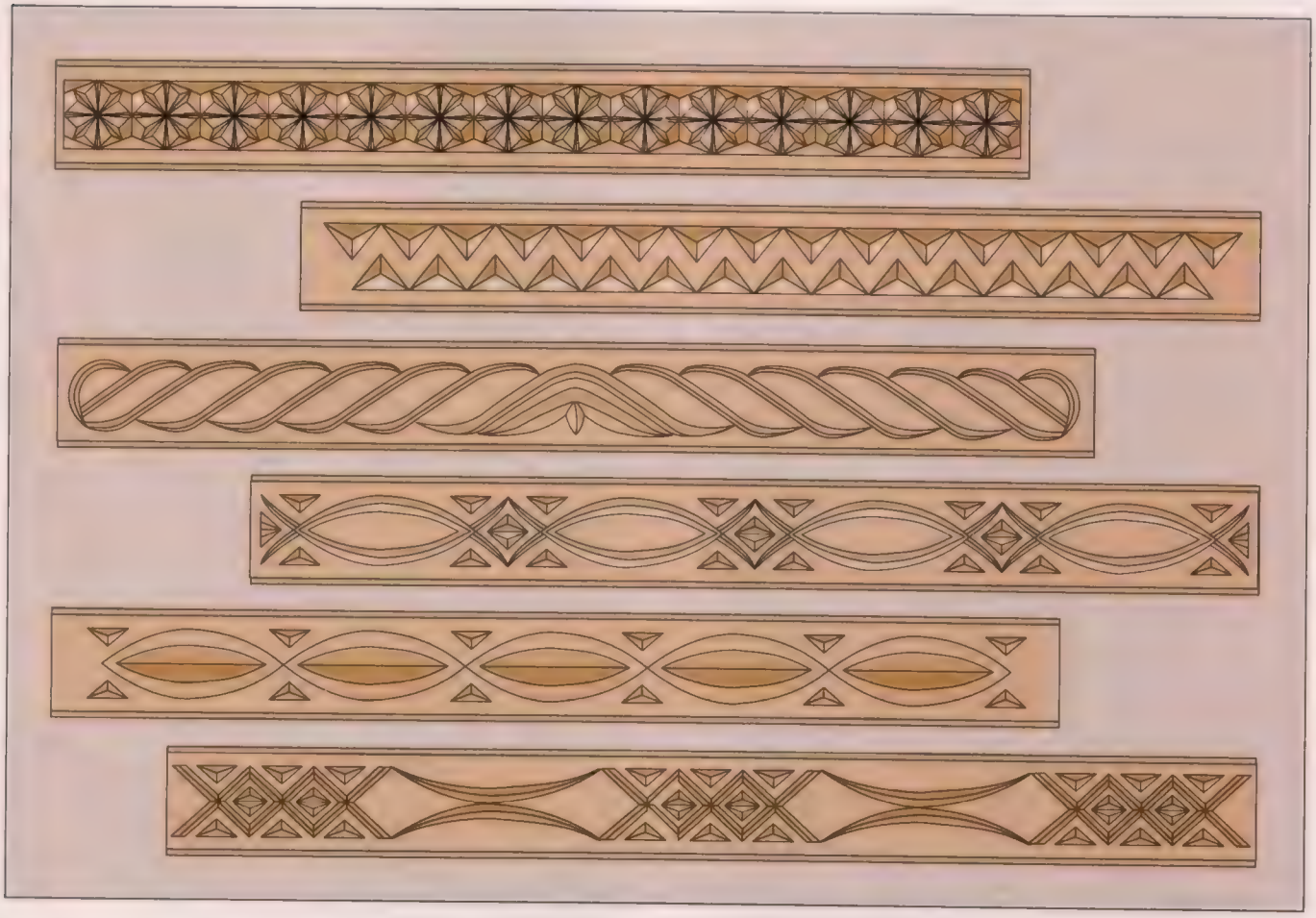
BORDERS

Decorated borders are surprisingly effective embellishments. Even something as simple as a double row of three-cut triangles can dress up an otherwise plain piece of furniture. Perhaps the most popular use of borders is for decorating box lids, particularly jewelry boxes. The gallery below shows chip-carved border designs of varying degrees of sophistication. Laying out a border properly is half the challenge.

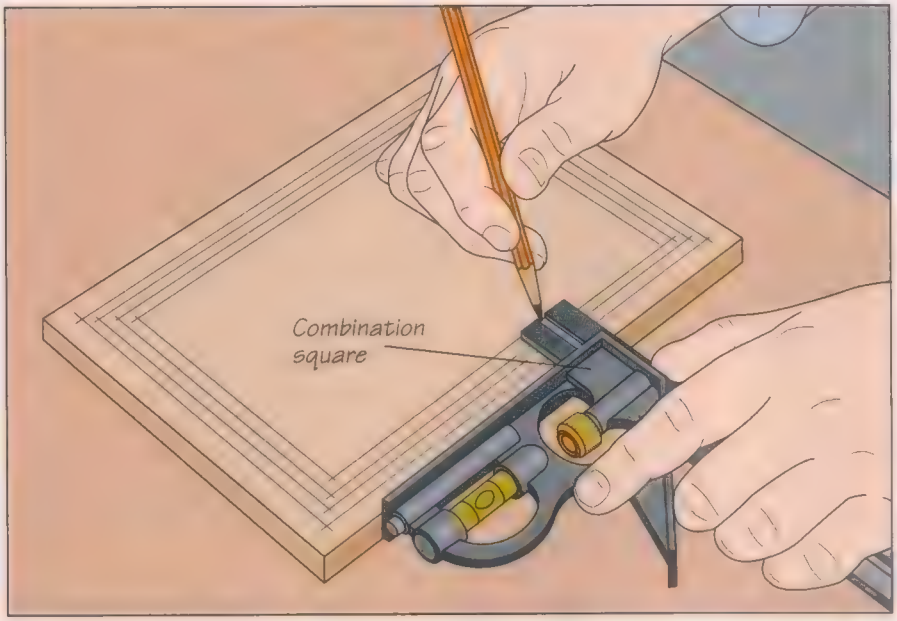
Experienced carvers can draw a border directly on the wood with little forethought. Beginners may consider outlining the surface onto a sheet of graph paper to see whether the proportions are pleasing. You can then experiment with different combinations until you find a pattern that complements the size of the workpiece. Transfer this pattern to the stock with a combination square and pencil.

Layout is crucial to border carving. The carving shown in the photo at left was divided into approximately ¼-inch squares. The long lines were drawn first then sectioned into smaller squares. These sections are an important guide when cutting the chips. Notice that the squares are half the width of the chips.

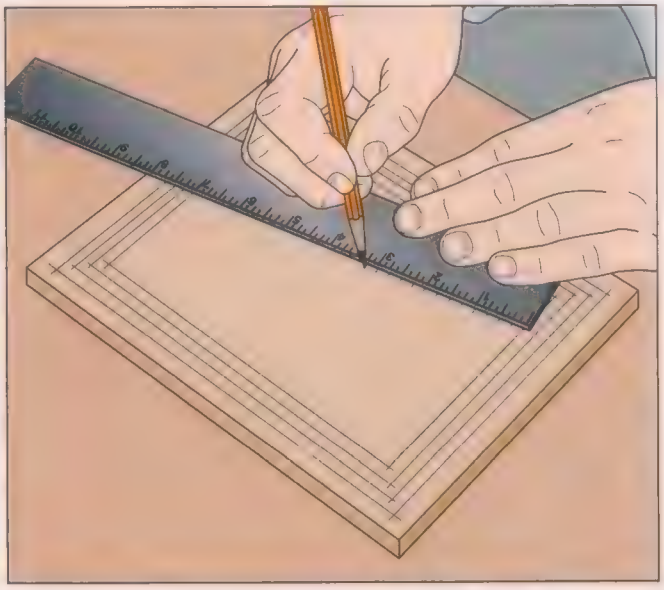
A SAMPLE OF BORDER DESIGNS



LAYING OUT A BORDER



1 Drawing the border lines
Once you have decided on the layout *(see previous page)*, transfer the lines to the workpiece with the aid of a combination square. To draw each line, first set the rule to the correct distance from the edge of the stock to the first line—actually slightly less to allow for the pencil lead thickness. The lines in this example are spaced ¼ inch apart. Hold the base of the square against the workpiece edge and the pencil against the ruler end and slide the two along the board. Since soft wood mars easily, remember to press lightly. Repeat the procedure to draw any additional lines *(left)*.

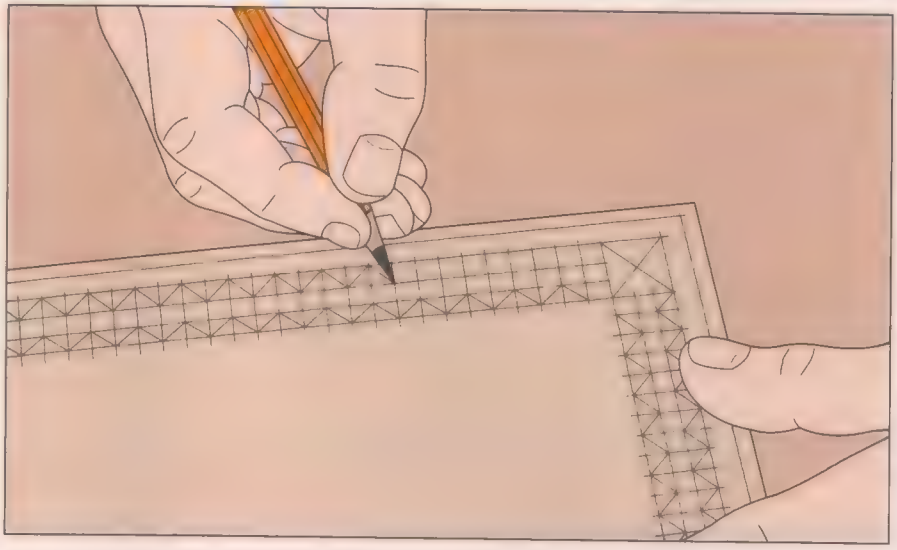


2 Dividing the lines
Divide the lines into sections according to your design. The exact size of the sections is not as important as getting them exactly equal. In this case they are all spaced ¼ inch apart, except for the corners, which are ¾-inch squares. To divide the lines, use an old carpenter's trick for marking a board into equal parts. Set the ruler on the workpiece with one end on the innermost short line. Pivot the ruler until one of its ¼-inch marks touches the opposite short line. Then make a mark at every ¼-inch point *(above)*.

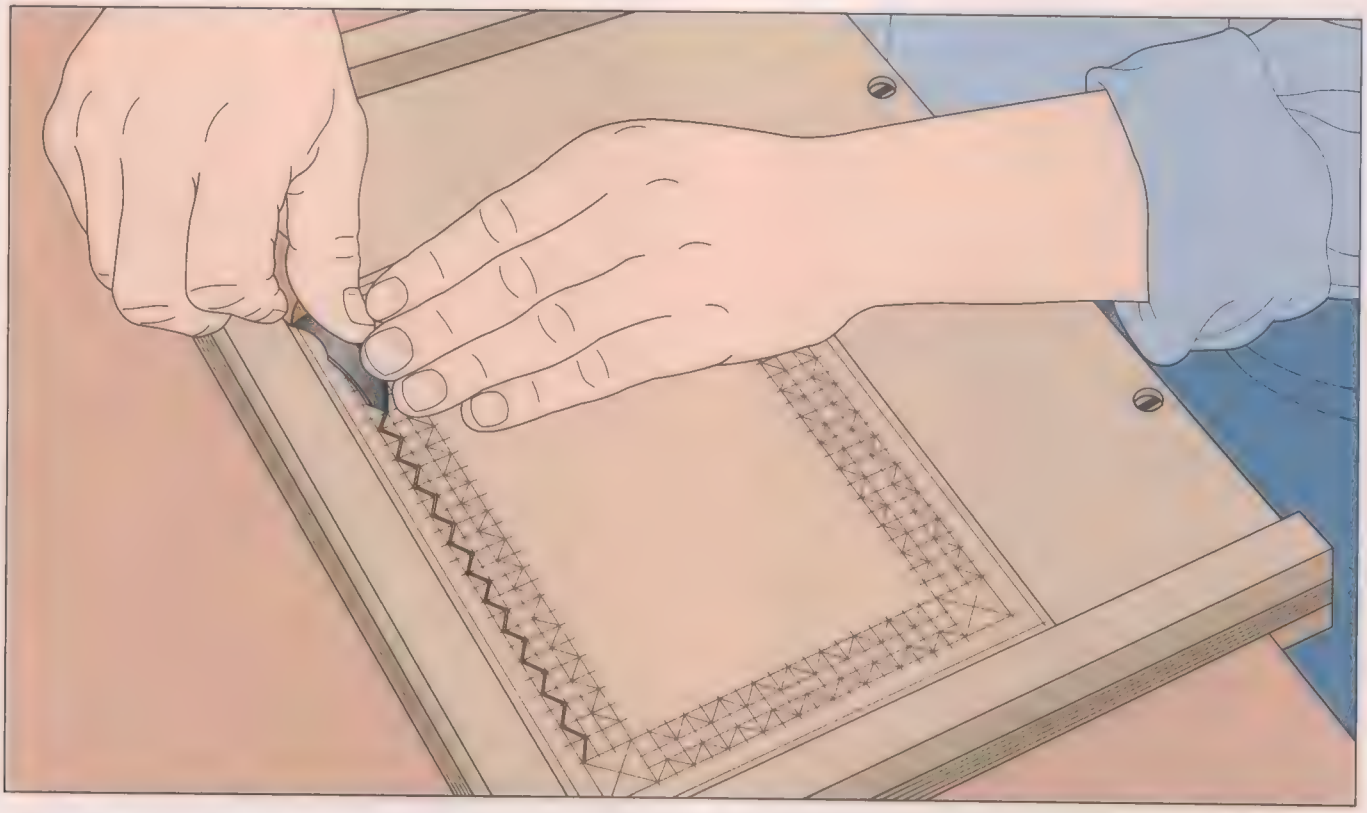
3 Drawing the sections
Use a combination square to mark out the sections. Set the base of the square against the long edge of the workpiece and line up the ruler with one of the marks made in the last step. Draw the dividing lines across border marks *(above)*. Do not draw the line right across the board since any excess will have to be sanded off.

4 Filling in the sections

Once the sections have been defined, all that remains to finish the layout is to fill in the squares. For this example it is simply a matter of drawing in alternating diagonal lines *(right)*. For some of the designs on page 58 this step may be more complicated, but the small size of the squares makes freehand work fairly easy.

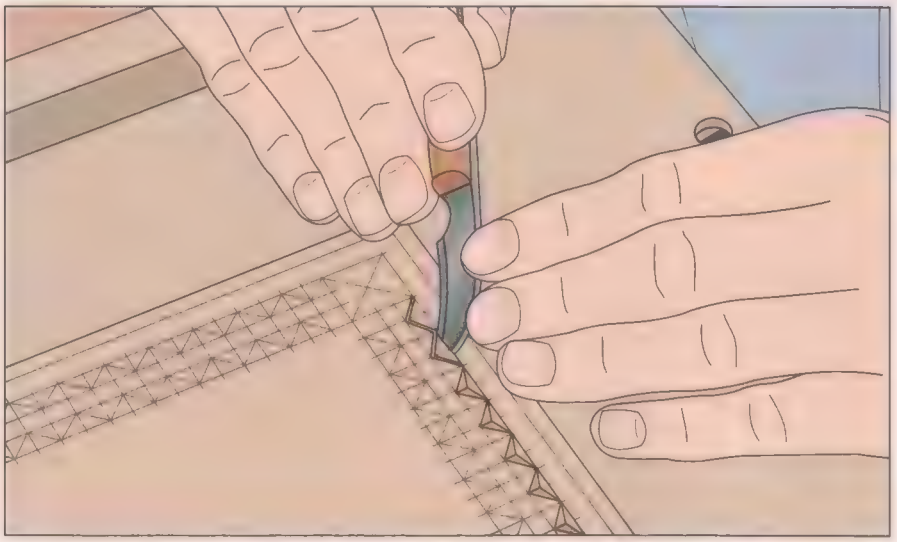


CARVING A BORDER



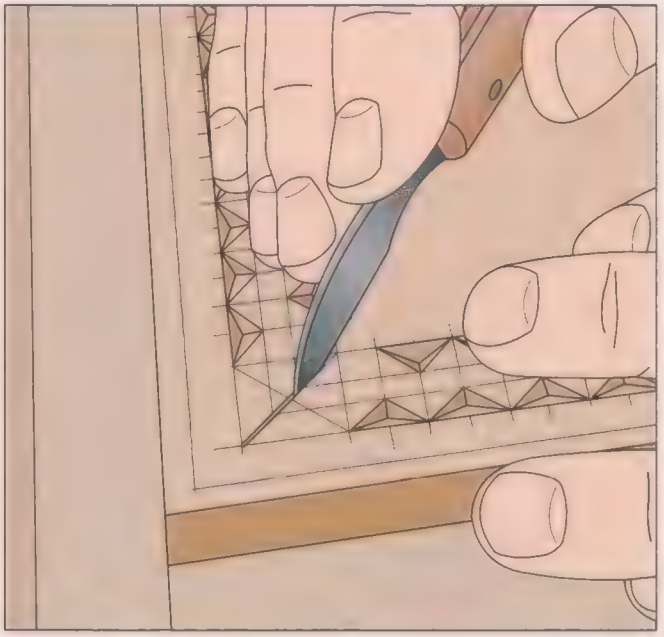
1 Cutting out the triangles

The triangles are removed with the standard three-cut technique *(page 51)*. Begin by making the two stop cuts. Position the blade over the first line with the tip in the corner. For this design, the stop cuts should be made nearly vertical, so hold the blade without much angle. Push the tip into the wood to a depth of ⅛ inch at the middle then cut back toward the opposite corner. The depth of cut should decrease evenly to zero at the end. Use your free hand to guide the blade and push it into the wood *(above)*.

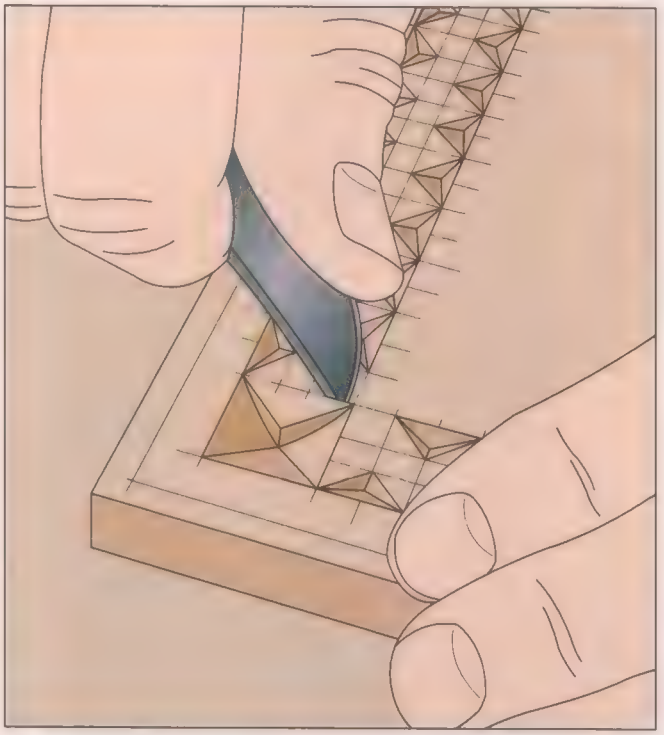


2 Removing the waste
Finish each triangle with an angled cut that frees the waste chip. Cut along the line, holding the blade at a fairly low angle so the tip will meet the bottom of the stop cuts *(left)*.

CARVING THE CORNER SECTIONS



1 Making the stop cuts
The recessed square is made in a similar fashion to the six-cut triangle. First, the stop cuts are made so they meet at the same depth in the center. This divides the area into four small triangles. Make the stop cuts in four strokes. Begin with the tip of the knife on the center of the square with the blade lined up with one of the lines. Push the tip of the knife into the wood to a depth of 3/16 inch, then pull it straight to the corner and upward *(above)*. Repeat for each section, turning the board as necessary.



2 Removing the waste
Remove the waste by cutting out each of the four little triangles in turn. To take out each section, position the tip of the blade on the line and at the correct angle to meet the stop cuts. Push the knife into the wood *(above)* and pull it into the opposite corner, using your free hand if necessary to guide and move the blade.

LETTERING

A sanding block is used to remove any splinters and pencil or carbon paper marks around the letters in a sign. Using a block will keep the letter edges crisp. Holding the sandpaper in your hand will tend to round over the edges.

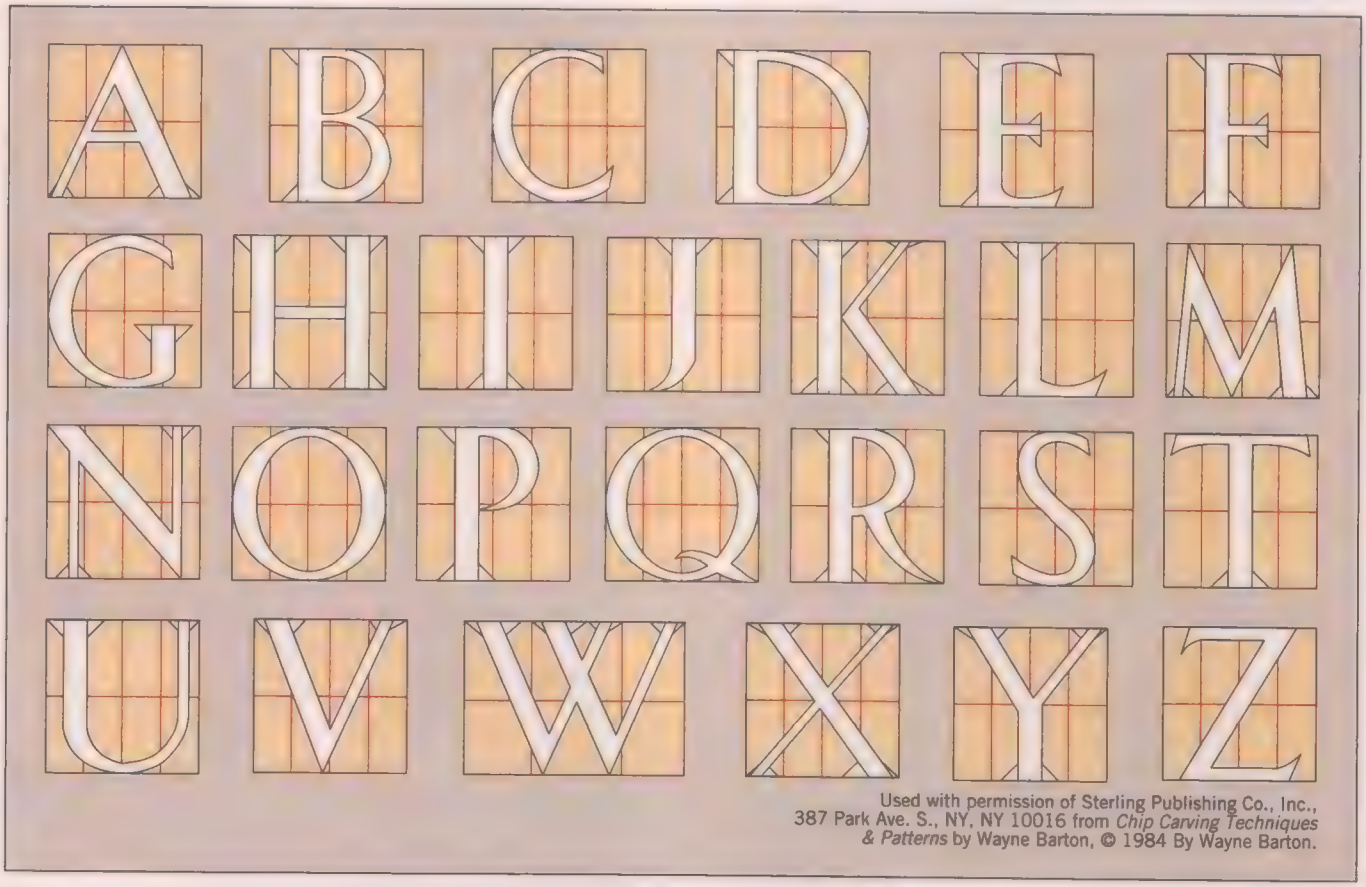
Sign-making with incised lettering is one of the most popular uses of incised carving. It takes time to learn and even longer to master. This probably explains the widespread use of router-based lettering systems. But these are expensive and cannot create the level of detail obtainable with hand carving. Even a simple alphabet like the one shown below would be impossible to make with most template systems.

Choosing the style of letter—or font—is the first step of making a sign. Any art store will have books showing dozens of type styles. The alphabet below is a good choice for many projects—interesting, but not too fancy. For a challenge, see the Old English alphabet on the front endpaper.

Laying out the letters takes some care. There is more to it than giving an equal space for each letter, or even an equal gap between each letter. Some letters, like As and Vs, actually overlap other letters. A simple solution to this is to use cutout paper letters *(see opposite page)*. Find the best arrangement through trial and error.

To make the letters appear more prominent, they can be given a gilded finish *(see page 138)*.

SAMPLE ROMAN ALPHABET



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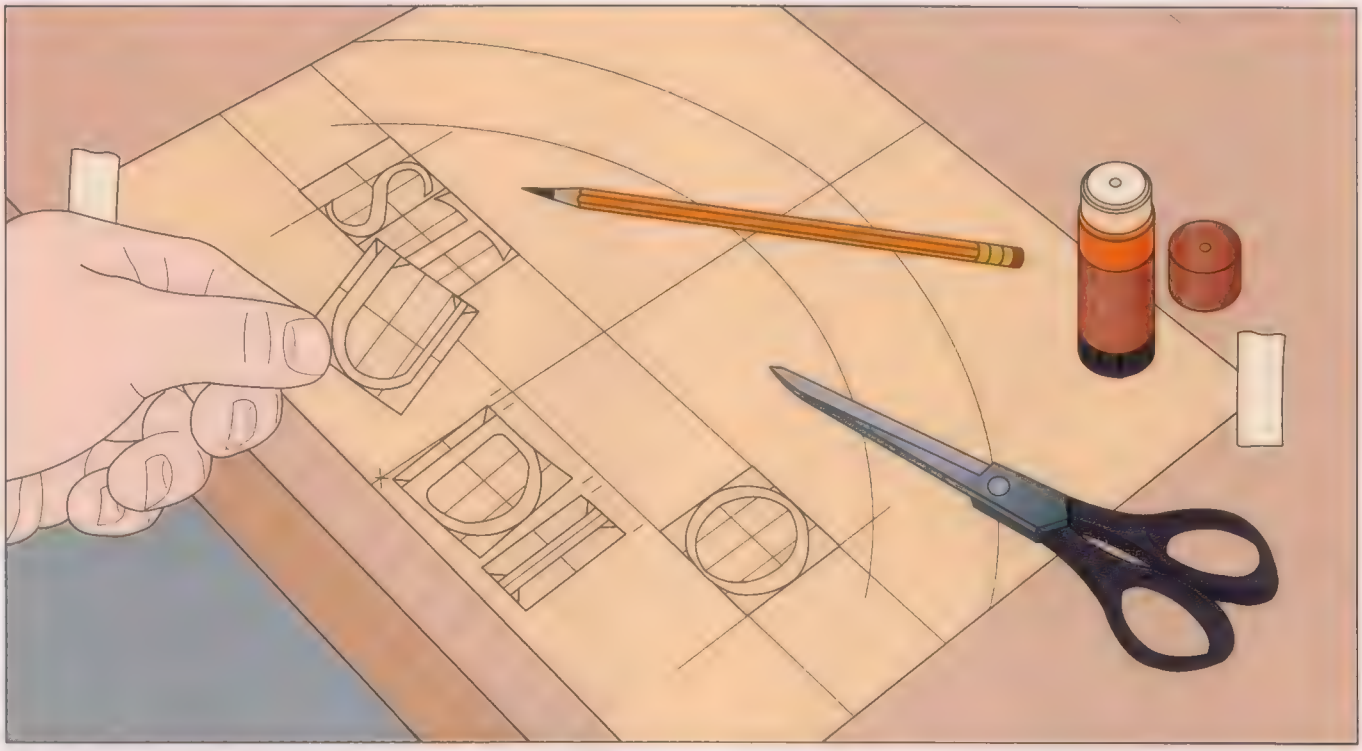
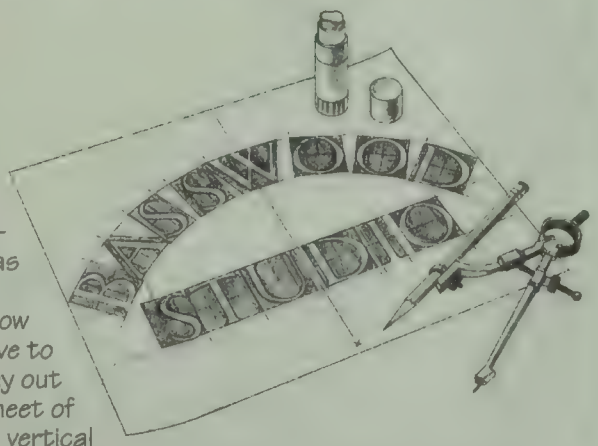
CARVING A LETTERED SIGN



SHOP TIP

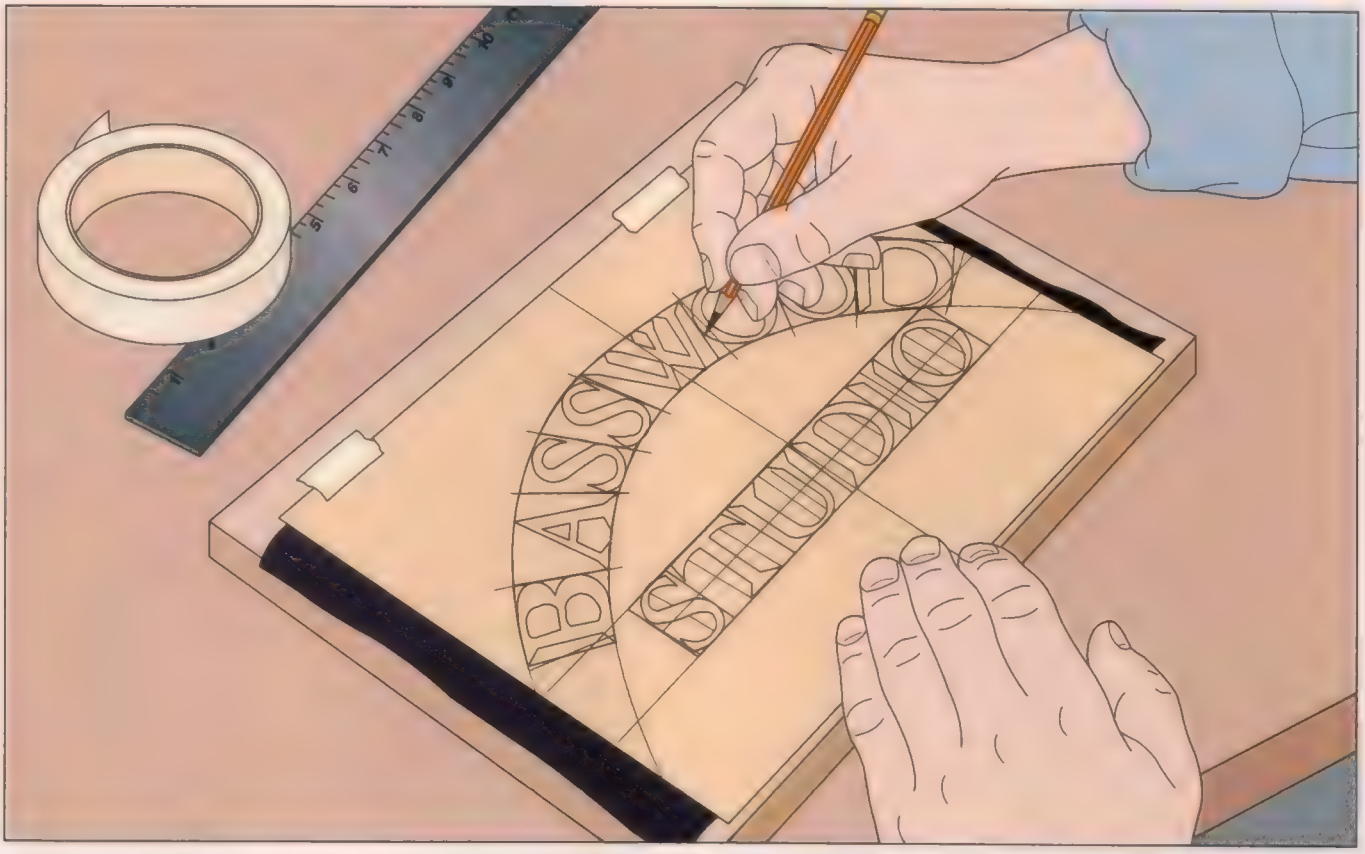
Curved layout

A curved layout is more complex than working with straight lines. The start and ending points as well as the radius of the curve, can affect how much room you have to fit in the words. Lay out the letters on a sheet of paper, then draw a vertical centerline to help you orient the letters. Lay them out in an approximation of the desired arc. Adjust a compass to draw the lower edge of the arc. Assemble the letters on this line. If there is too much space, decrease the radius; if the words need more room, lengthen it. Redraw the line and test the fit. To move the words up or down, shift the compass as necessary along the centerline.



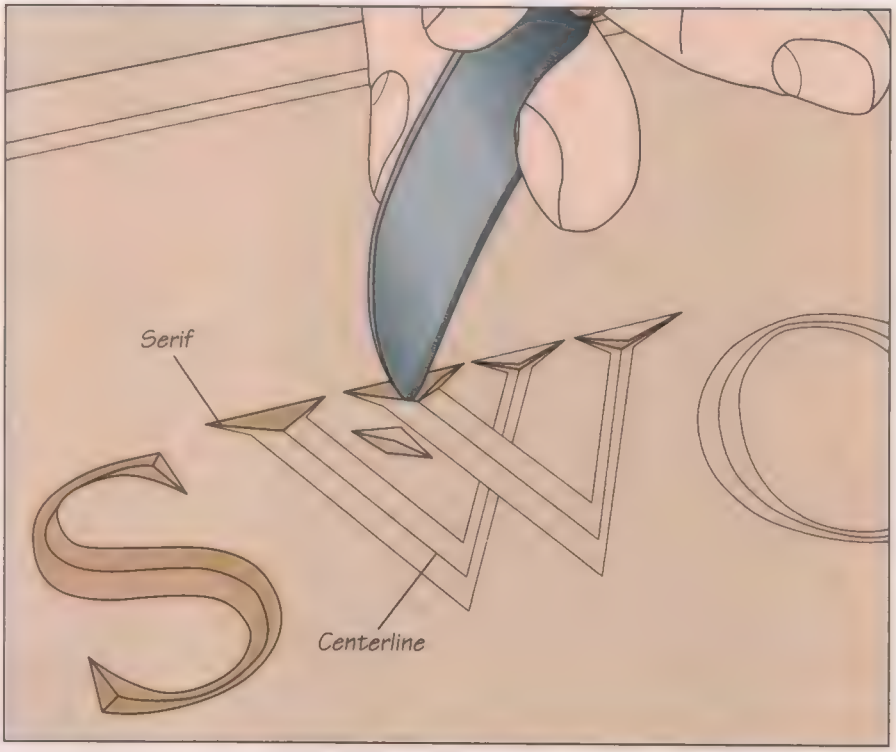
1 Laying out the letters

Enlarge the facing page on a photocopier to get the letters of the size you want, then cut out the blocks. Trim the narrower letters, like I and S. Draw two parallel lines to mark the top and bottom limits of the letters. Set out all the letters you need, then adjust them until you have the proper spacing. Remember that certain combinations, like Vs and As, can overlap slightly. Make a small pencil line to mark the letters' positions, then glue them all in place.



2 Transferring the letters

Transfer the letters to the sign with carbon paper. Position the pattern exactly where you want it on the board and tape it in place. Slide a sheet of carbon paper under the pattern, then trace the letters.

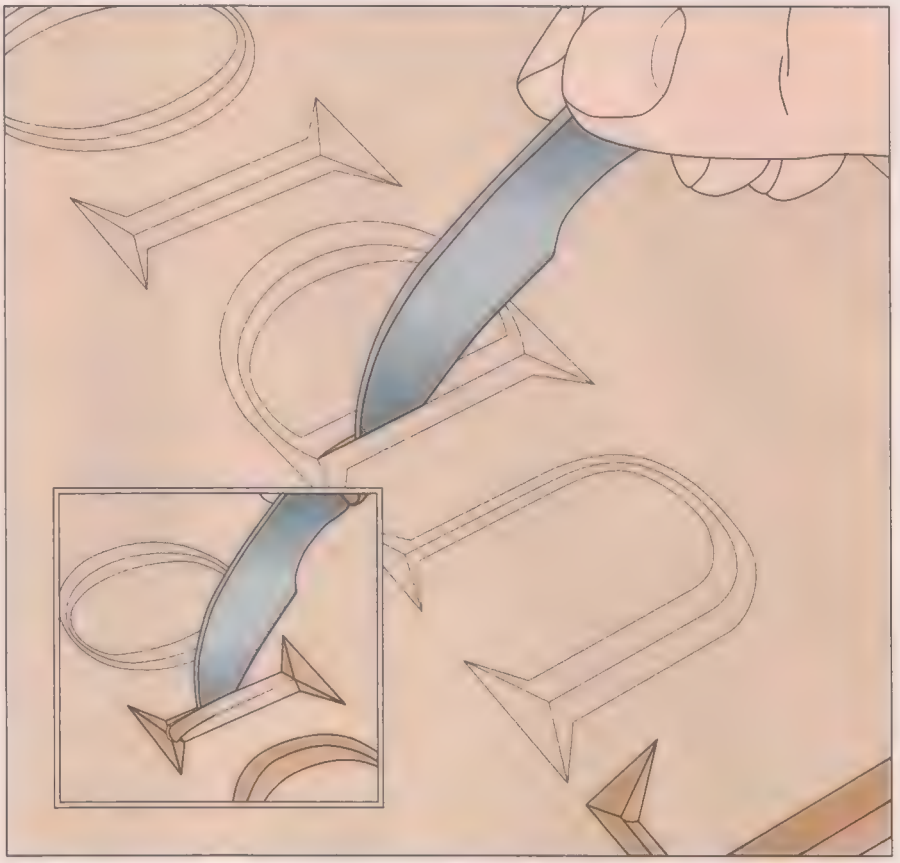


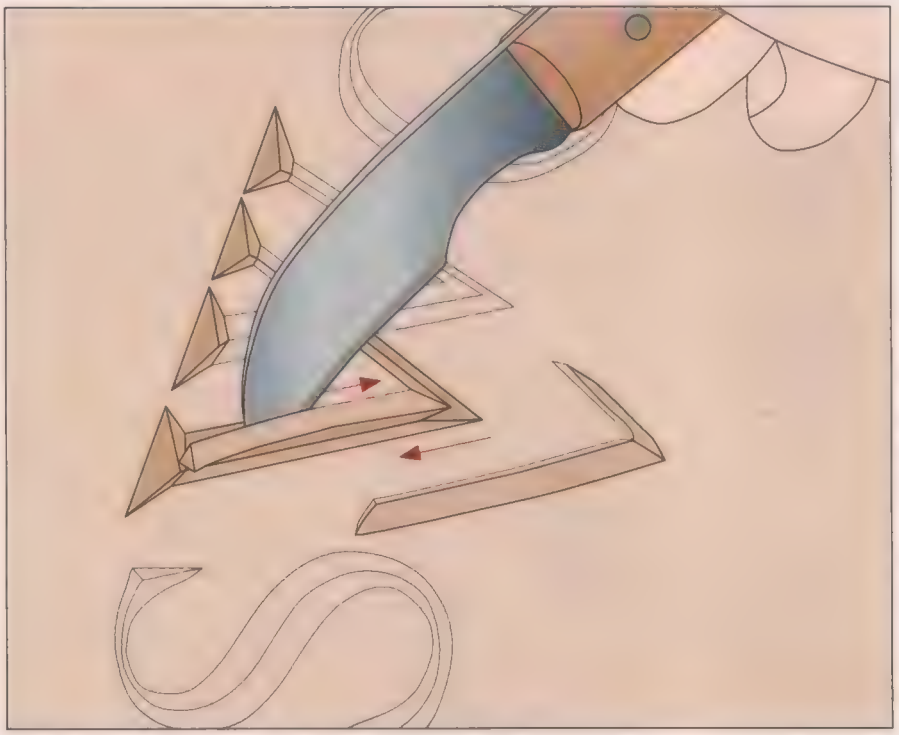
3 Cutting the serifs

Letter cutting is very similar to six-cut chip carving, especially when cutting out the serifs, the decorative flourishes at the ends of letters. Draw centerlines down the length of the letters and in the serifs, as shown. Cut out the serifs first with a variation of the six-cut triangle *(see page 52)*. Make a stop cut into each of the centerlines. Cut to a depth of about 3/16 inch. Remove the waste in the little triangles, exactly like a regular six-cut triangle.

4 Making the stop cuts

Perfectly straight cuts several inches long can be as hard to master as curves. The trick is to focus your eye on the line just in front of the blade. With a bit of practice your hand will naturally follow your eye. Cross-grain cuts are easier than those parallel to the grain, which tends to pull the blade off-track. Start with the knife tip at the bottom of the serif then pull it towards the other end *(right)* at a consistent depth of about 3/16 inch. Use your free hand to help move the blade and keep it under control. Remove the waste with a straight cut along the marked line *(inset)*. Angle the blade so the tip will reach the bottom of the stop cut.



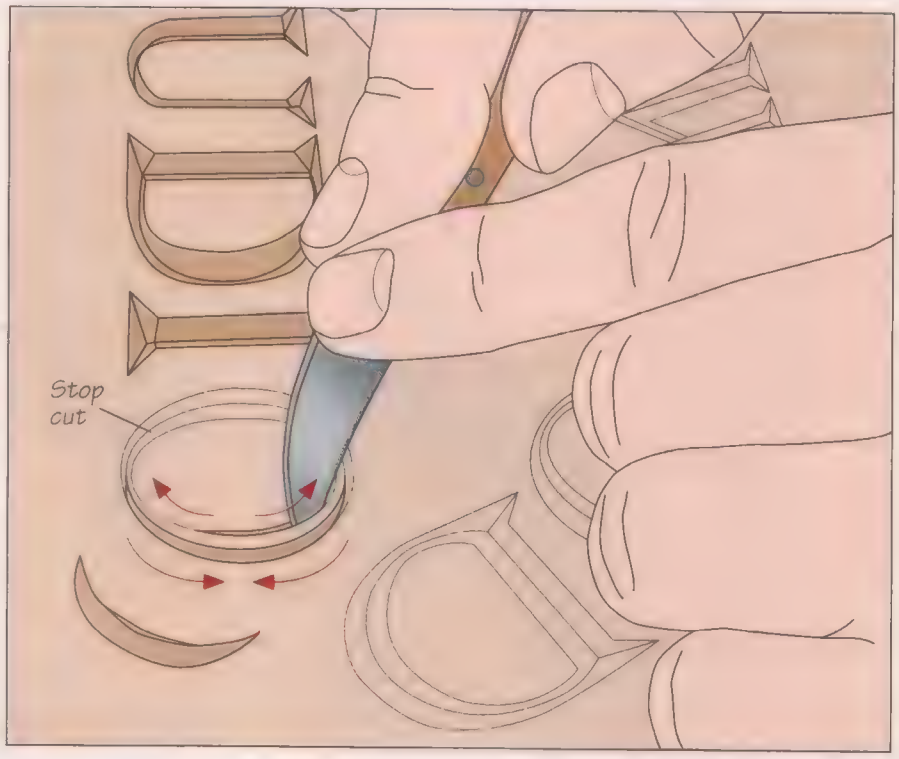


5 Making special angled cuts

Letters like Ws and Vs have pointed elements. Try to remove the waste in one piece to get as clean a cut as possible. First make the stop cuts as usual. The cuts should not overlap at the point, but meet cleanly. In the example shown, remove each section of waste in two strokes, working in the directions shown by the arrows. Cut at an angle to meet the stop cuts and free the chip. Cut away the other half with a standard straight cut *(left)*.

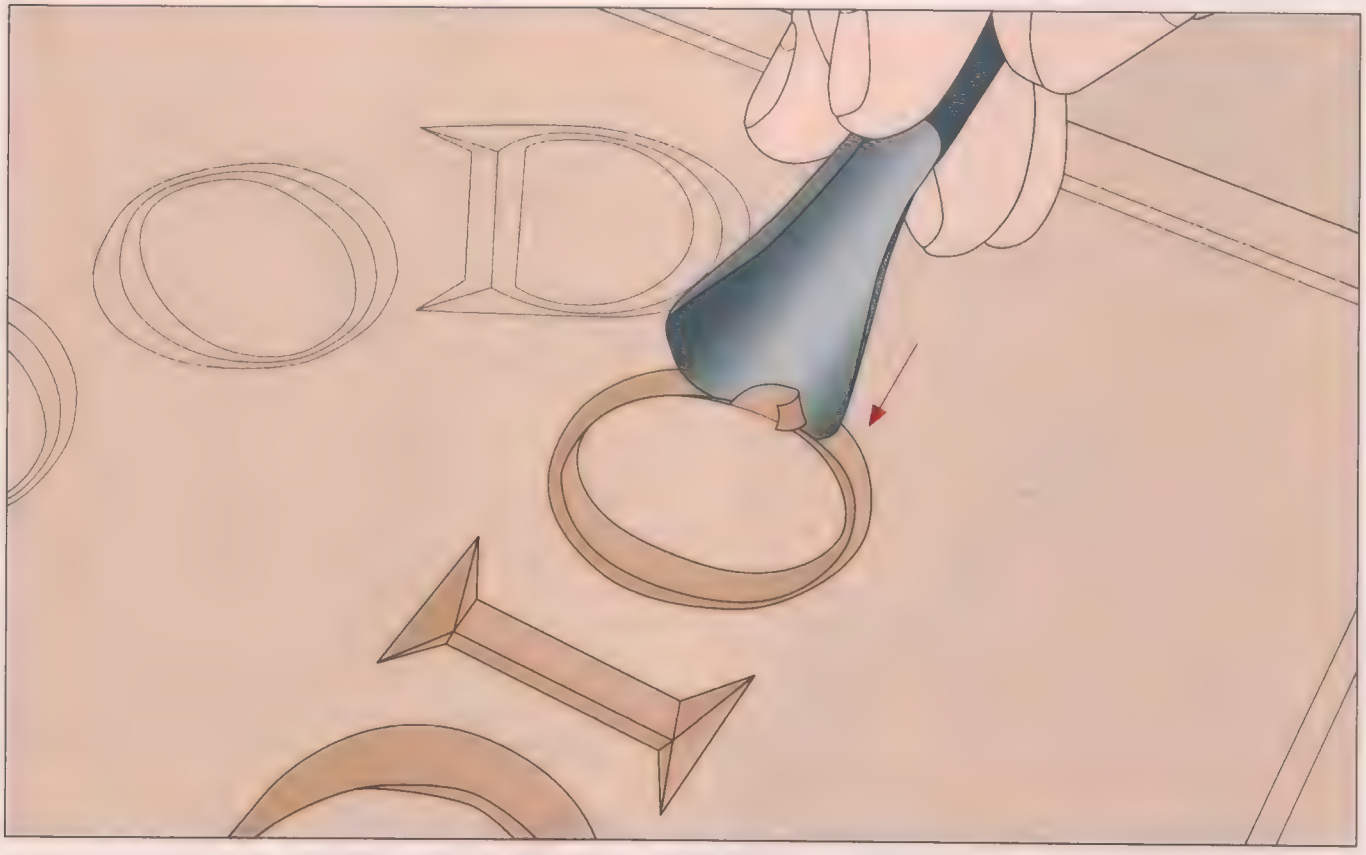
6 Cutting circles

Circles are a challenge to cut since you must deal with constantly changing grain direction. First make the usual stop cuts around the circle. Remove the waste by making an angled cut along the curve *(right)*. The arrows show the direction you must cut in order to work with the grain.

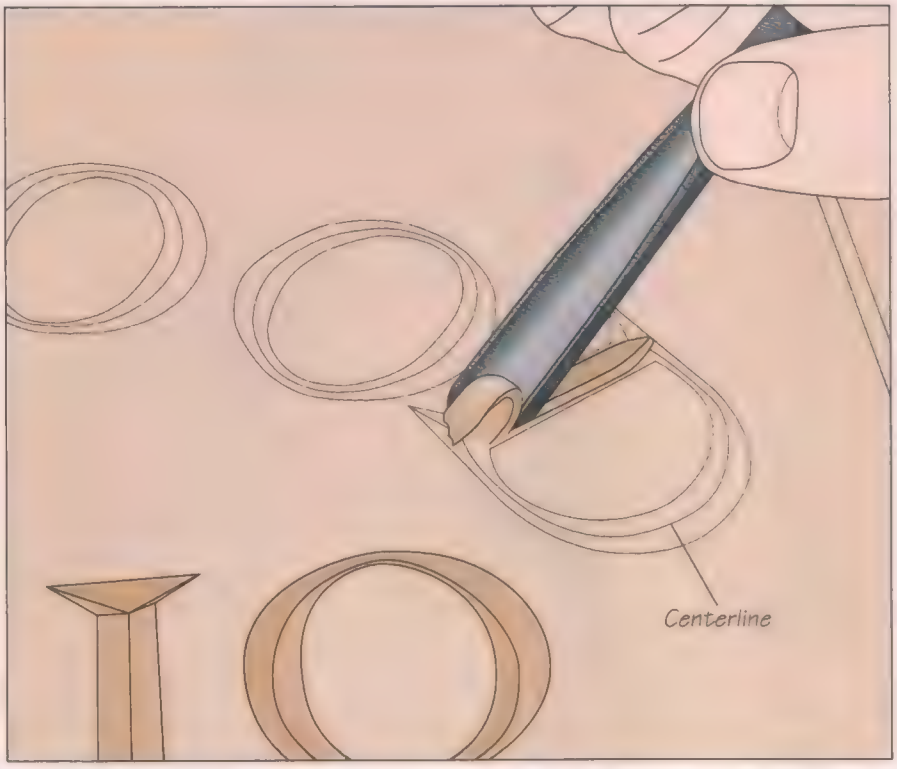


7 Cleaning curved sides

It can sometimes be difficult to make a clean edge at the point where you change cutting direction. One way to remove stray fibers is with a gouge. Select one that matches the radius of the curve and clean up the side with a few downward cuts *(below)*.

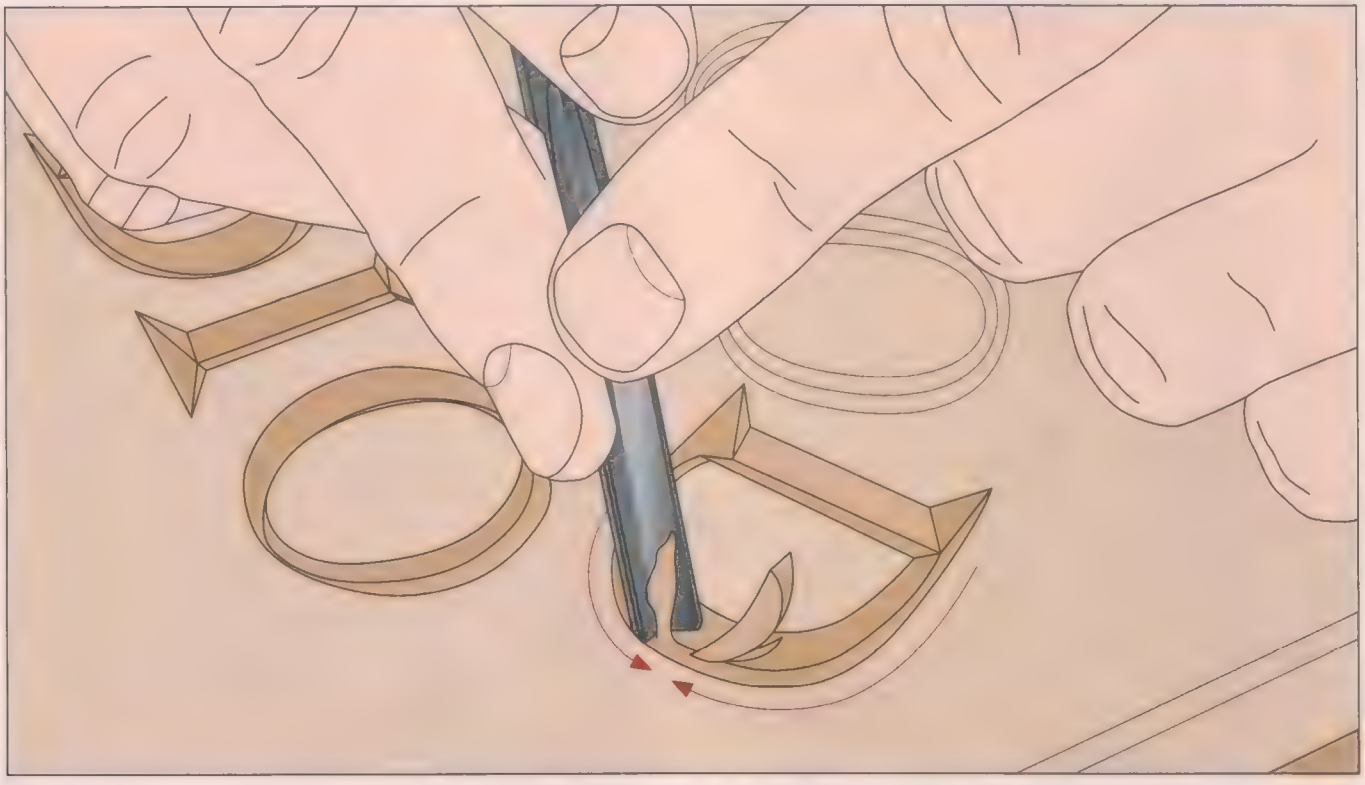


WORKING WITH A V-TOOL



1 Cutting straight lines
Some carvers who work frequently with a V-tool find that it also serves well for incising letters. Lay out the letters and draw centerlines, then incise the letters in a few shallow passes, increasing the depth with each cut *(left)*.

2 Cutting curves
Cutting incised curves with a V-tool takes a fair bit of practice. The problem is that, because of the shape of the tool, if one edge is cutting with the grain, the other is cutting against it. To minimize this problem, work so that you are cutting with the grain on the outside of the letter, as shown by the arrows in the illustration *(below)*. Make a final pass to trim the sides of the groove, moving the tool in the opposite direction of the arrows.



RELIEF CARVING

No one knows when relief carving was invented, but it might well have occurred when an ancient carver made a simple but important leap of imagination: Rather than carving a shape into a board, why not remove all the wood around the shape to leave it standing proud of the surface? This modest innovation opened up a new realm of realism in carving, with its own techniques and inspirations.

Examples of relief carving have been found in ancient Egypt and in the Greek, Roman, and Byzantine empires. Celtic and Scandinavian cultures used wood far more extensively and produced some of the most elaborate, fanciful carvings ever created. Norwegian artisans, for example, used motifs of endless, interlaced, dragonlike figures to decorate even modest household items like tankards and chests. By the Middle Ages, northern Europeans began mixing natural themes like leaves and vines with the symbols of Christianity.

The acanthus leaf is the classic example of borrowing from nature for artistic forms. The numerous curves make it a considerable challenge for the carver to avoid cutting against the grain.

The first project in this chapter, a shell design *(page 70)*, is in keeping with the ancient tradition of drawing on nature for inspiration and decoration. The shell became a particularly popular form during the 18th Century, appearing on cabriole legs, highboys, and blockfront desks. There are infinite ways to vary the design; the gallery on page 70 hints at some of this diversity. The example shown starting on page 71 is actually fairly advanced with its shell-within-a-shell design. Using the techniques in this chapter, even the beginning carver will be well armed to try any shell design.

Low relief carving, like the barnyard scene on page 80, is all about tricking the eye. The distance between the background sky and the tree in the foreground is scarcely more than ⅜ inch, but the scene appears much deeper. The process uses techniques like undercutting behind the roof and the tree to create shadows that give the illusion of depth. This and other techniques that can be applied to a variety of subjects are explained starting on page 82.

Creating the illusion of depth in a relief carving involves several techniques, including undercutting. Here, the carver uses a skew chisel to pare away wood where the tree meets the background, making the tree appear as though it is separate from the rest of the carving. The result is a more realistic, three-dimensional look.

FANS AND SHELLS

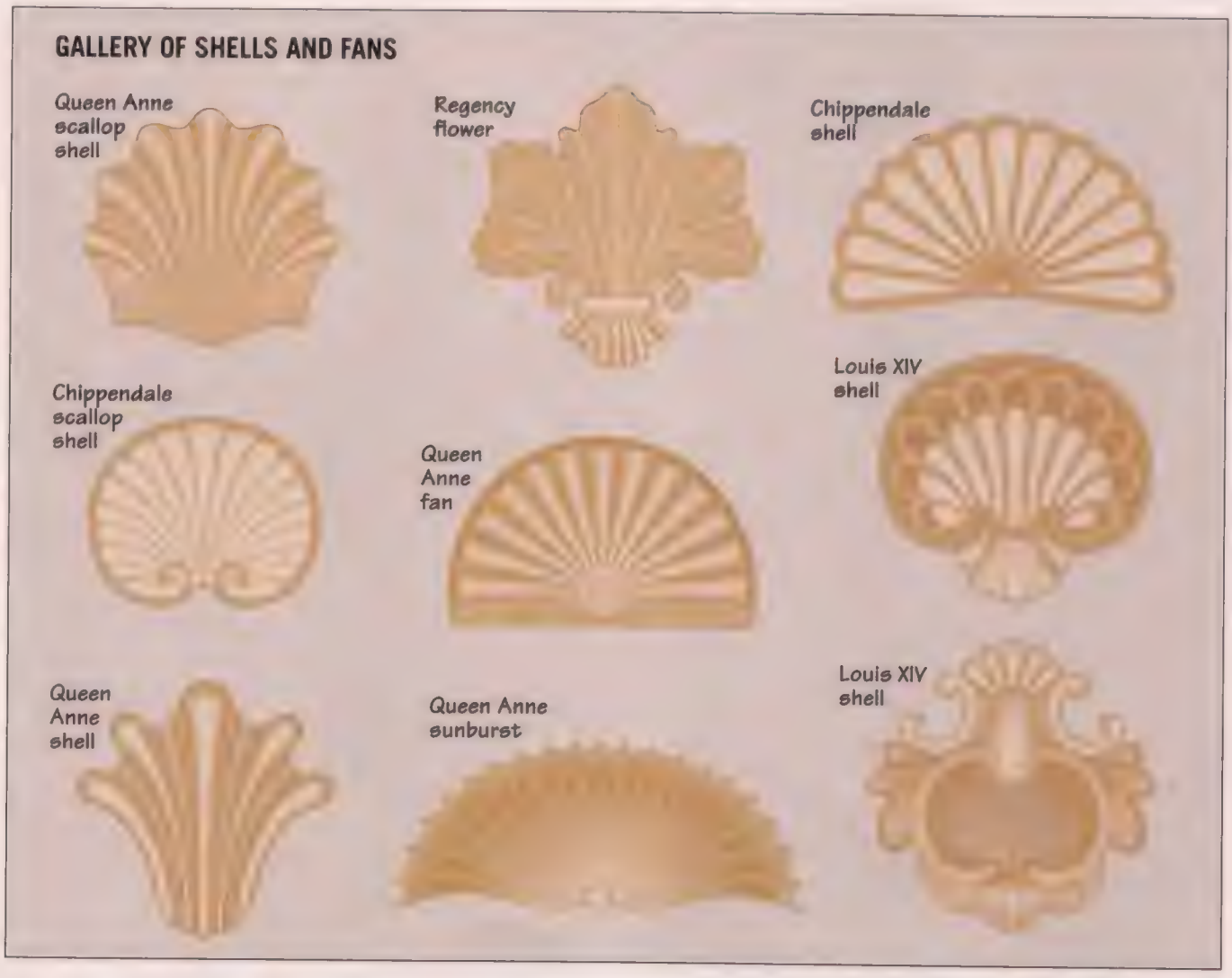
A Philadelphia highboy exhibits both convex and concave shells. The shell has been a popular motif since the 18th Century.

Applied shell carvings supply a splendid finishing touch for many styles of furniture, adding an elegant bit of detail. In fact, authentic Queen Anne and Chippendale reproductions often require them.

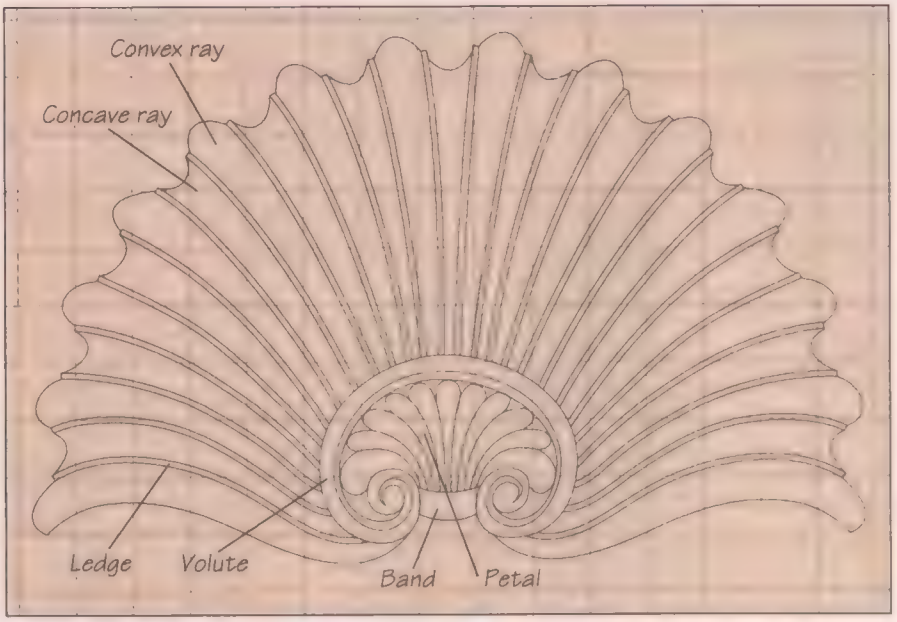
An accurate drawing of the desired form on the workpiece is crucial. The problem is that in the process of carving the shell, the lines are shaved off and must be redrawn continually. While this cannot be avoided, it can be made more convenient by transferring the drawing to a sheet of clear acetate. These are available in any office supply store. The design can be drawn directly on the plastic. Also you can photocopy the design directly onto special plastic sheets. This is the method used for both relief carving projects in this chapter.

To prepare the carving blank, transfer the shell design to the 3/4-inch-thick stock, then cut it out on a bandsaw. Saw out the shape by making a curved cut, passing just outside the tips of the shell rays. Make a few release cuts into the waste between the long rays, then saw out the waste. Next, cut out the round tops of the longer rays. Be sure to leave the flat space that marks the transition between convex and concave rays.

GALLERY OF SHELLS AND FANS

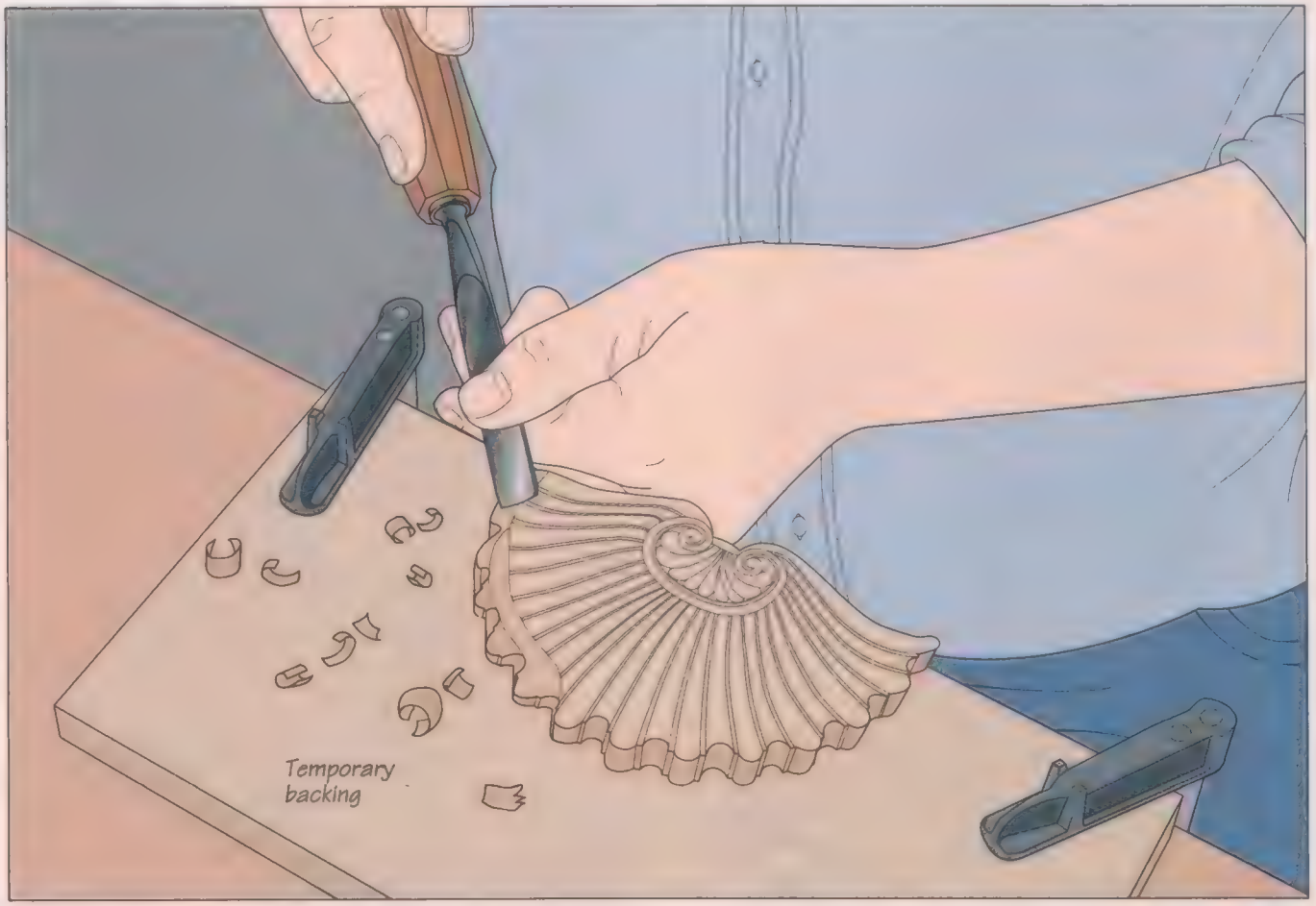


TRANSFERRING THE PATTERN AND STARTING WORK



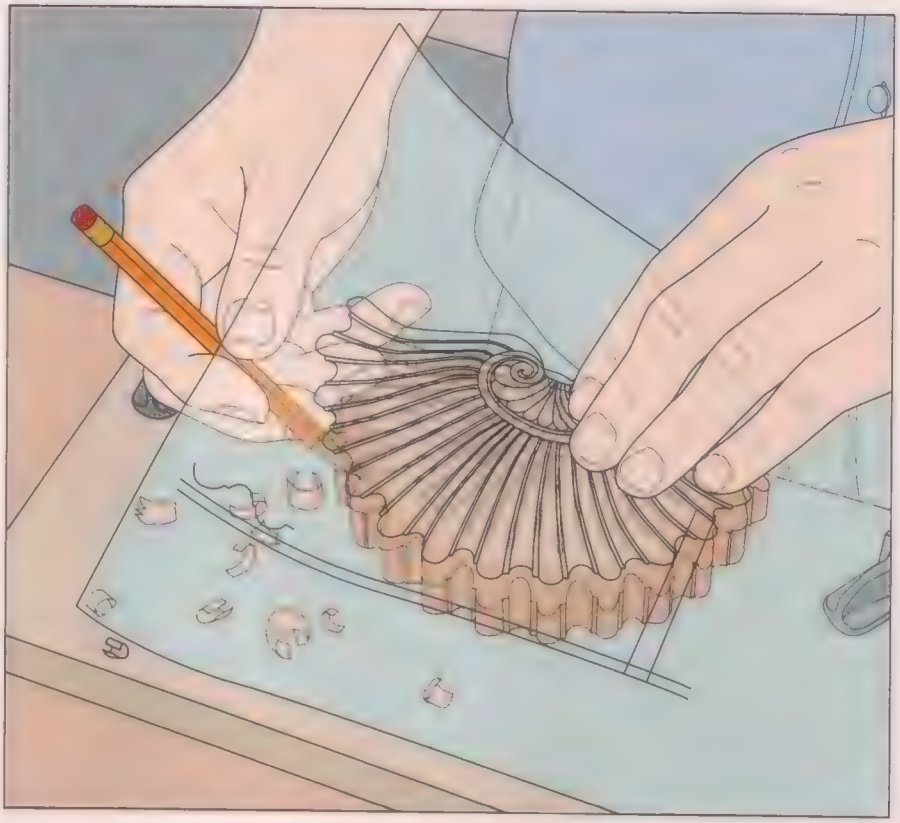
1 Rounding over the edges

After cutting out the outline as close as you can with the band saw, secure the shell blank to a temporary backing with double-sided tape and clamp the assembly to a work surface. Clean up the edges with a 12-millimeter No. 3 gouge. Then use the gouge to round over the curved edge of the shell *(below)*. Remove the waste from the whole edge in several passes. Round over the entire edge slightly with the first pass, cutting with the grain, then increase the radius with each following pass. Check the edge for smoothness and consistent curve by running your fingers frequently along it. This is more reliable than checking by eye alone.



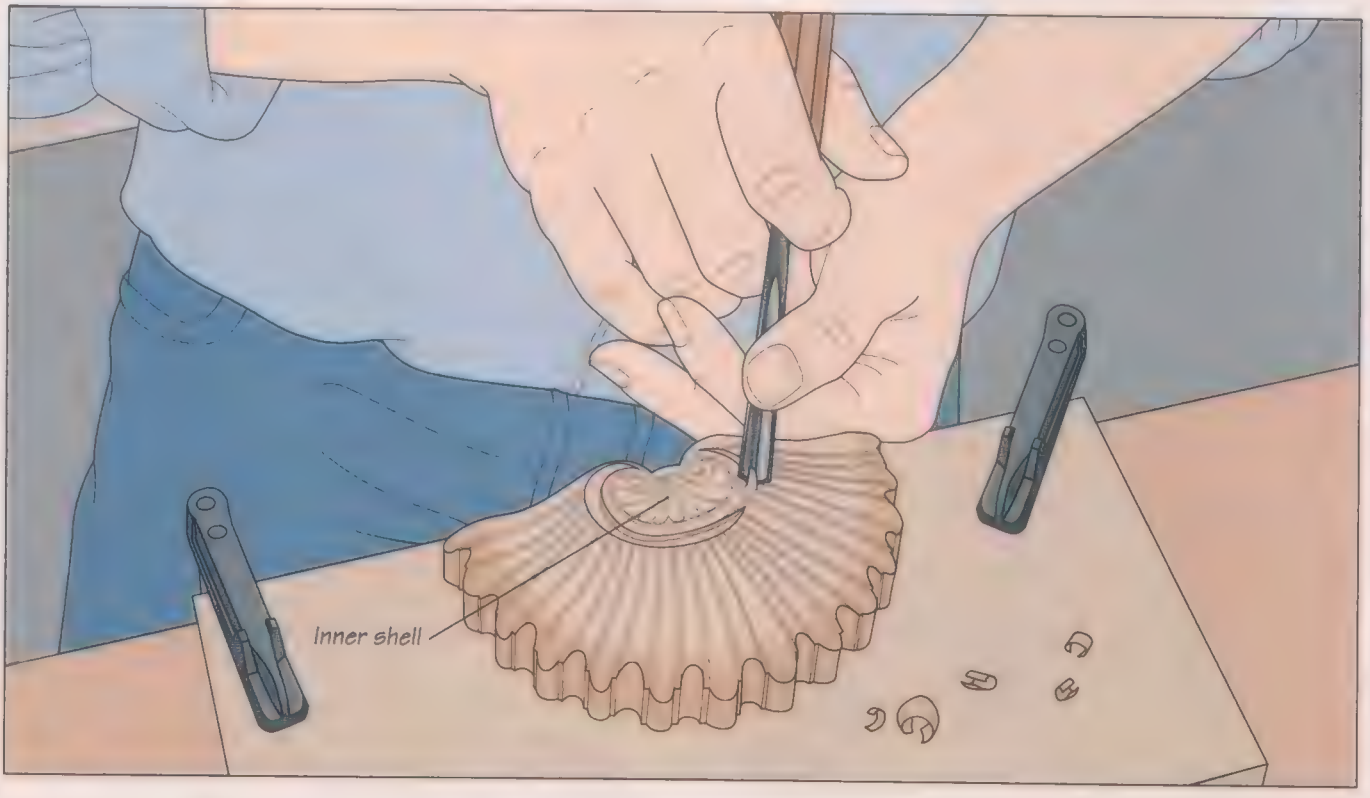
2 Retracing the pattern

A good portion of the shell drawing will be removed when you round over the edge. Since the pattern is on a clear transparency, however, it is a simple matter to redraw the lines. Reposition the sheet on the shell, lining it up over the volute. With a sharp pencil in hand, lift up the transparency just enough to allow you to trace directly under the pattern *(right)*. This is a handy technique that should be used whenever necessary throughout the project.



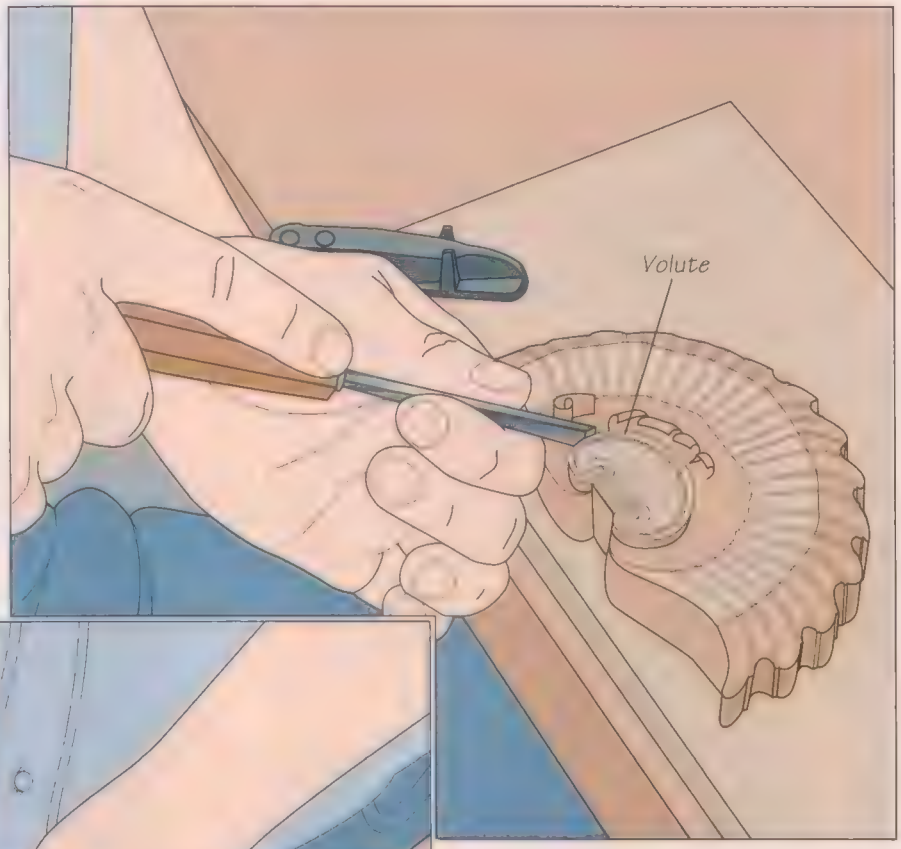
3 Defining the inner shell

Use a 12-millimeter No. 39 V-tool to delineate the small, inner shell from the rays of the larger, outer shell. Start by cutting a groove that stays just outside the edge of the inner shell. Deepen the cut in successive passes to a depth of about ¼ inch.

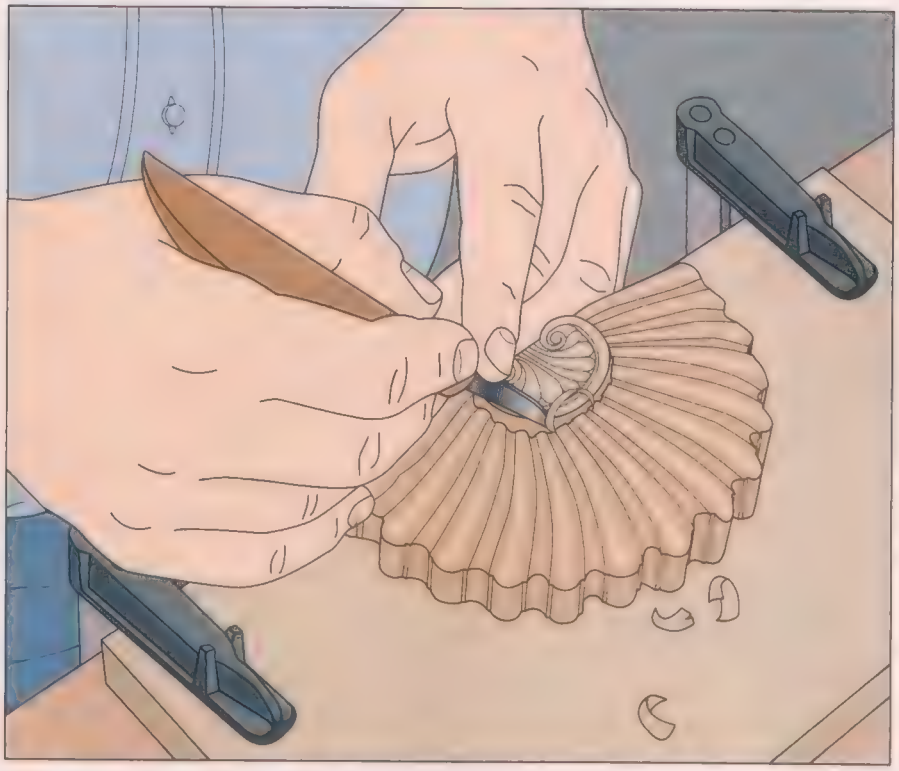


FORMING THE OUTER SHELL

1 Contouring the shell
The shell rays slope down as they approach the inner shell in a somewhat serpentine shape. Starting about an inch from the shell's edge, round over its profile in very slight shavings with a 20-millimeter No. 4 or No. 5 gouge, cutting toward the inner shell. In successive passes increase the depth of cut as you get closer to the base of the rays. You will end up with a series of semidetached waste pieces at the edge of the inner shell. Remove these with a 12-millimeter No. 39 V-tool *(right)*, cutting along the base of the volute with the tip of the tool.



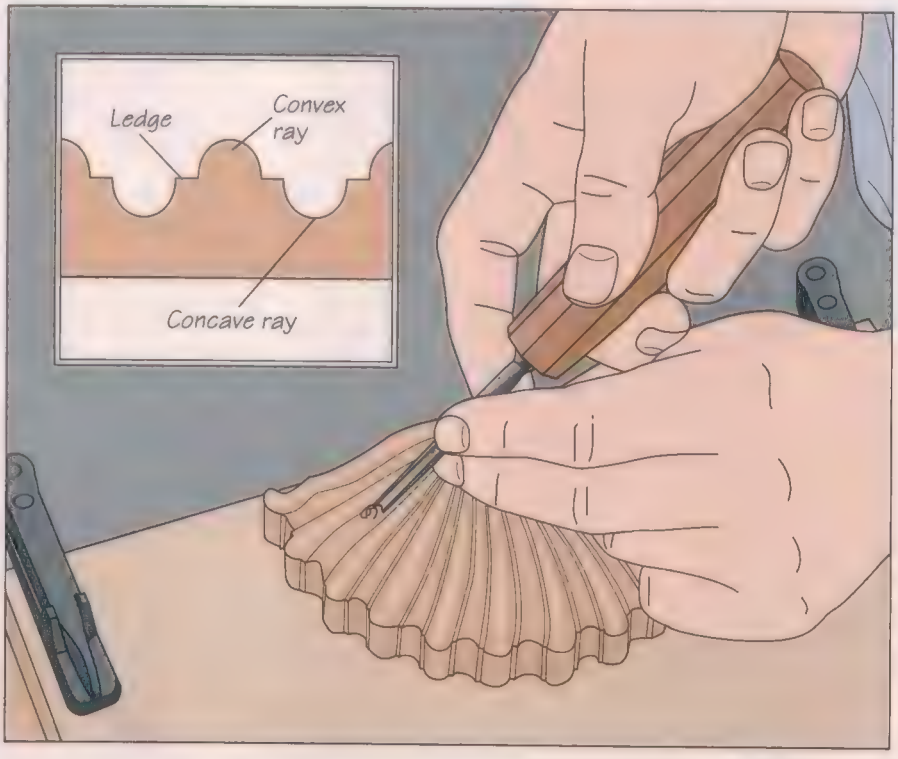
2 Cutting the concave rays
Redraw the rays after contouring the shell, then hollow out the grooves that form the concave rays. Mark a series of Xs on each of the concave rays to avoid hollowing out a convex section by mistake. Cut out the concave rays with a 12-millimeter No. 11 gouge *(left)*. Do not try to remove all the waste at once; instead, make several passes. Work the tool from the volute toward the shell tips as much as possible to get a clean cut. The base of the rays, however, must be grooved by cutting toward the volute and leaving a rough edge.



3 Separating the inner shell
Hollowing out the concave rays will leave a collection of semi-attached shavings protruding from the edge of the volute. To keep the base of the rays as clean and crisp as possible, remove them with a carver's knife *(left)*. Use a downward stroke to cut off the waste shavings cleanly. At this point, round over the convex rays to approximate shape with a No. 3 gouge or a No. 33 bent-back gouge. Remember to work with the grain, always cutting downhill.

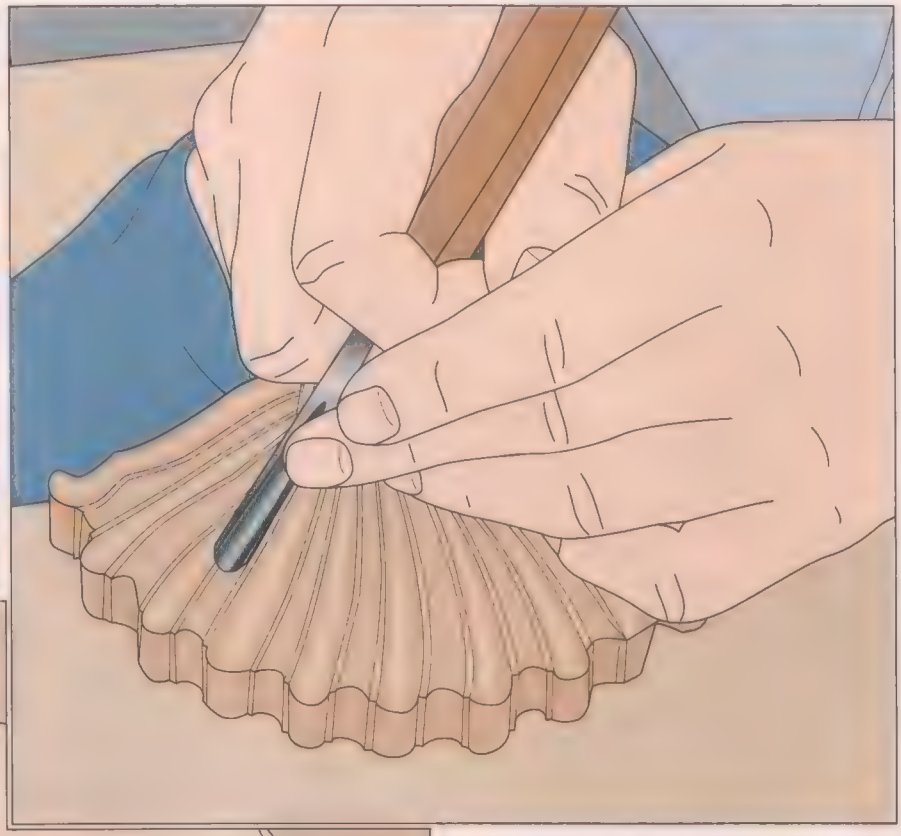
REFINING THE RAYS

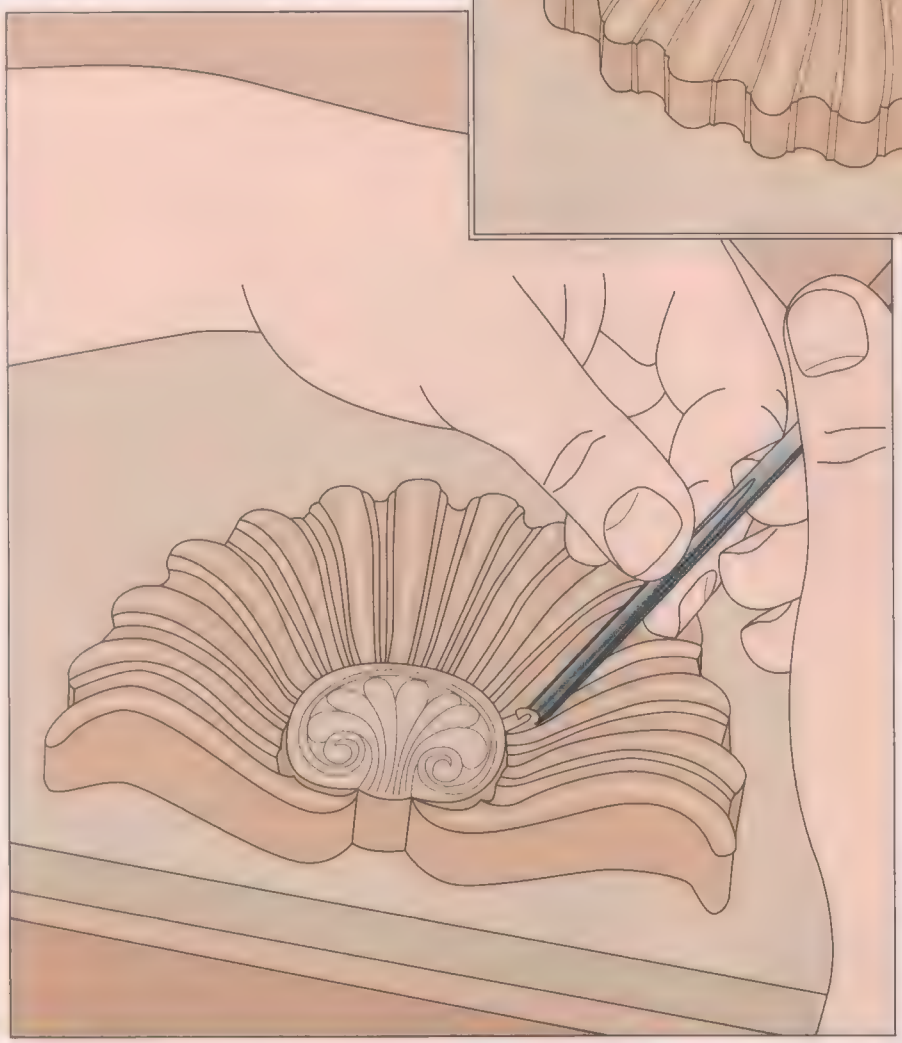
1 Cutting a transition ledge
Separate the convex and concave rays with a small ledge *(inset)*. Use a small No. 11 gouge to cut the ledge into the side of each convex ray *(right)*. Notice that the ledge is halfway between the top of the convex ray and the bottom of the concave ray. Use a 6-millimeter No. 39 V-tool to sharpen the transition between the ledge and ray. Make the ledges as smooth as possible, and at the same height from ray to ray.



2 Deepening the grooves

Use a No. 11 gouge to deepen the concave rays. This will make the ledges more pronounced. Choose a gouge that is close to the desired radius of the groove. Be very careful to avoid digging into the ledge. Shave down all the concave rays a little at a time to reach a consistent, uniform depth *(right)*. Use your fingers to feel for any bumps or irregularities and trim them smooth.

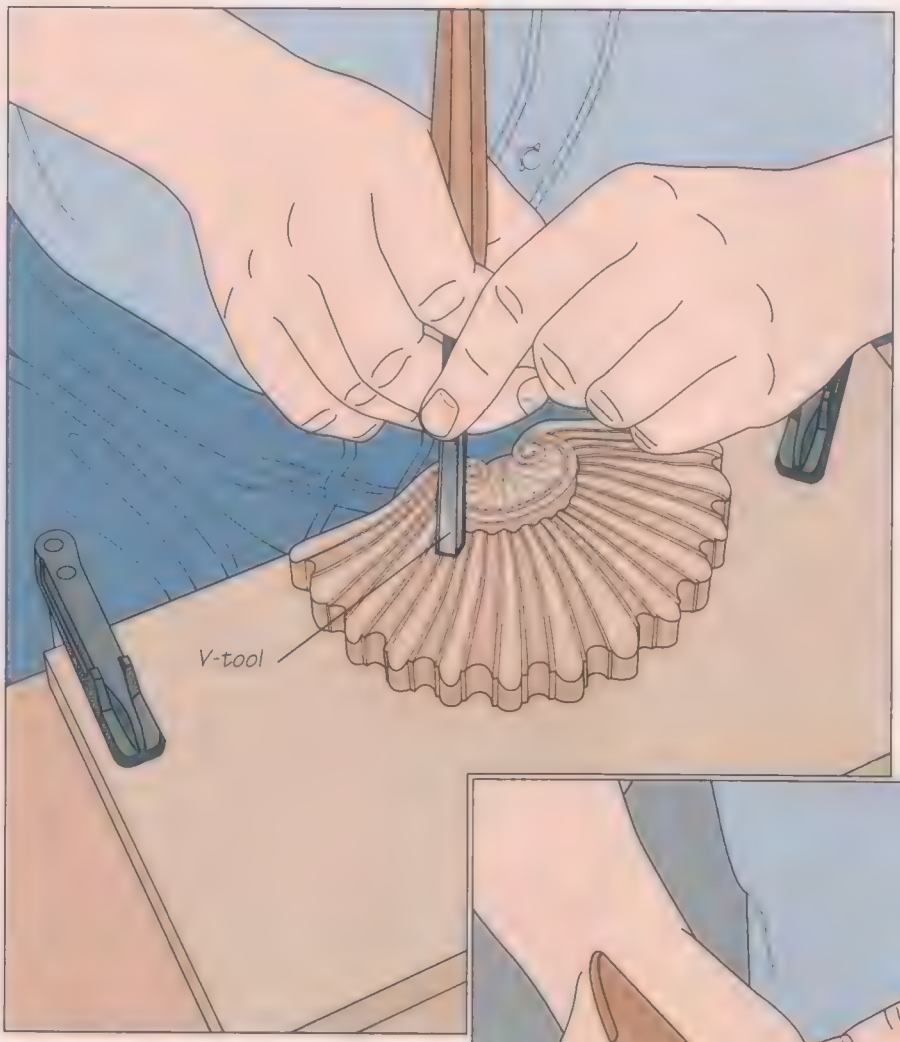




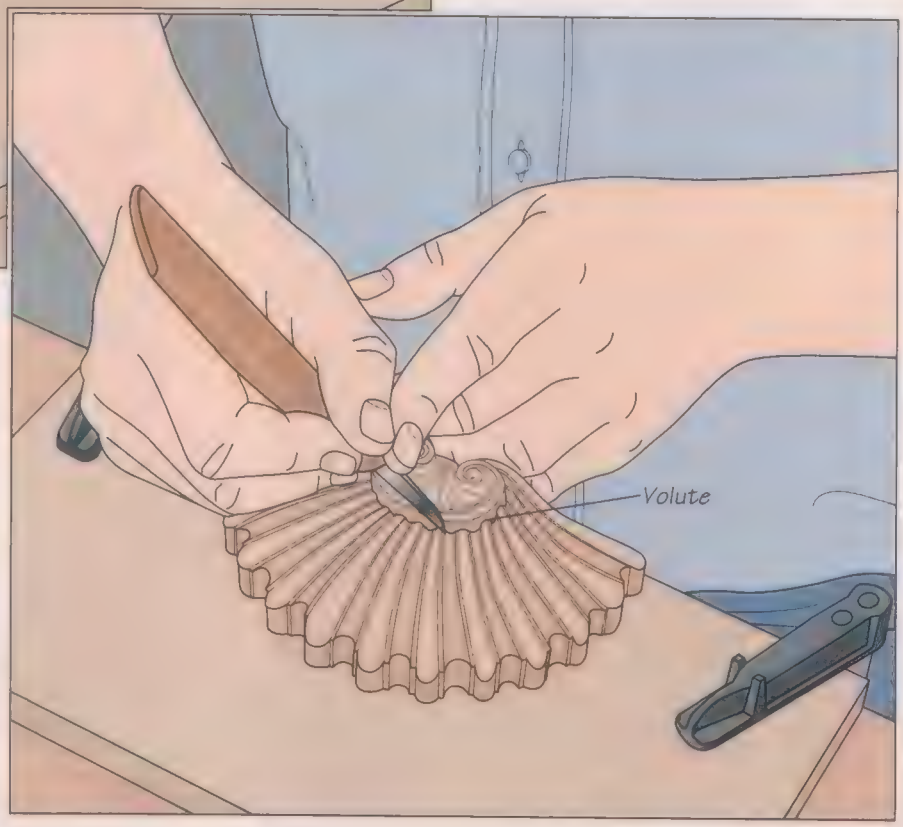
3 Refining the ledges

The gouge will leave a rounded transition between the ledge and the convex rays. Use a 4-millimeter No. 39 V-tool to flatten the ledge and produce a clean corner where these two elements meet. Position the tool so that one of its cutting edges lies flat on the ledge, with the tip in the junction of the ledge and the convex ray. Always work in a downhill direction: either toward the tips or the volute, as necessary. Refine the ledge in several passes, taking a fine cut each time *(left)*. You may find that you are undercutting the convex ray a bit. This can be fixed in the next step.

FINAL TOUCHES ON THE RAYS

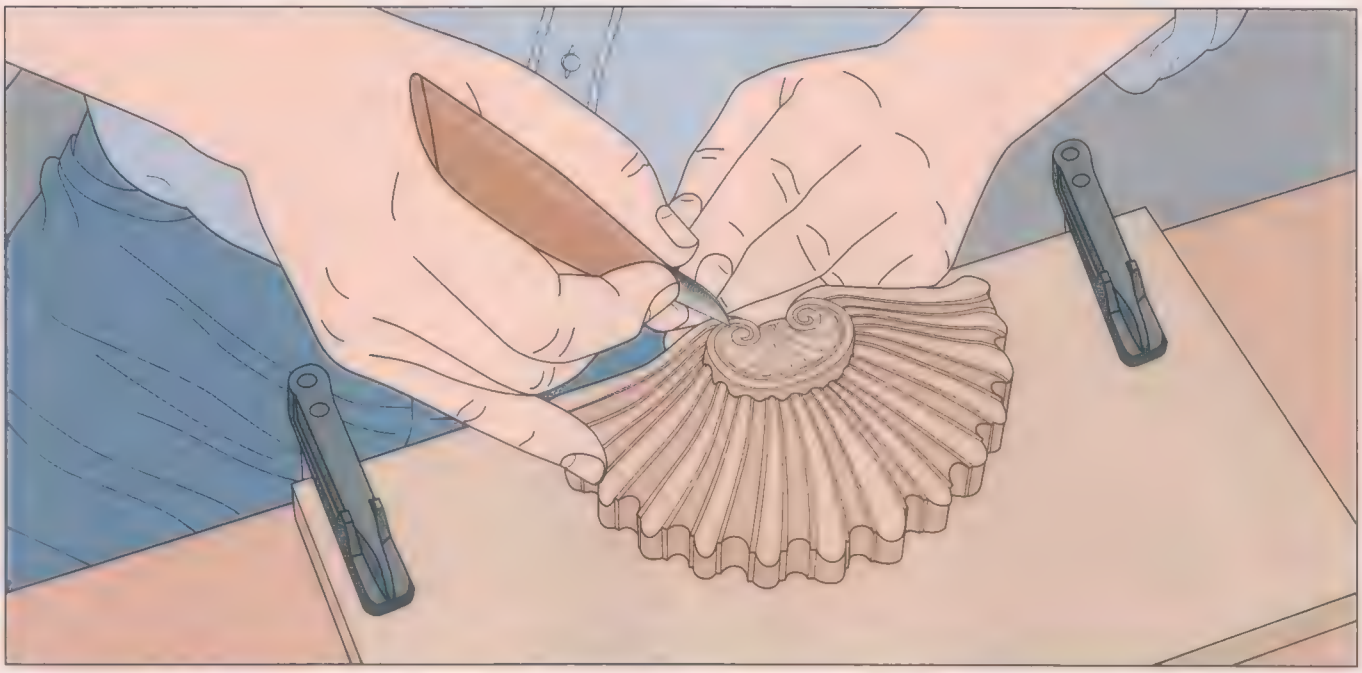


1 Smoothing the curves
Once all the large rays have been shaped, it is time to smooth the curves and make the rays consistent. Most of your tools will be needed at this stage. Use deep and shallow gouges to perfect the concave rays. Match the gouges to the radius of each section of the rays and take off the thinnest shavings possible. Use a V-tool to smooth the ledge *(left)*. A No. 2 chisel or a No. 3 gouge can serve to remove any bumps and smooth over the convex rays. They should meet the ledge at a clean angle. With experience you should be able to produce a finished shape with tools alone. At first, however, you may have to rely on 220-grit sandpaper to achieve a proper smoothness.



2 Cleaning the ray base
The process of cutting with the grain toward the volute will leave burrs and splinters at the base of the rays. Alternate between a sharp carver's knife and the narrow gouges to clean up this area. The knife can be used to cut straight down to sever these bits free *(right)*. Use the gouges to cut toward the volute as necessary.

MAKING THE INNER SHELL



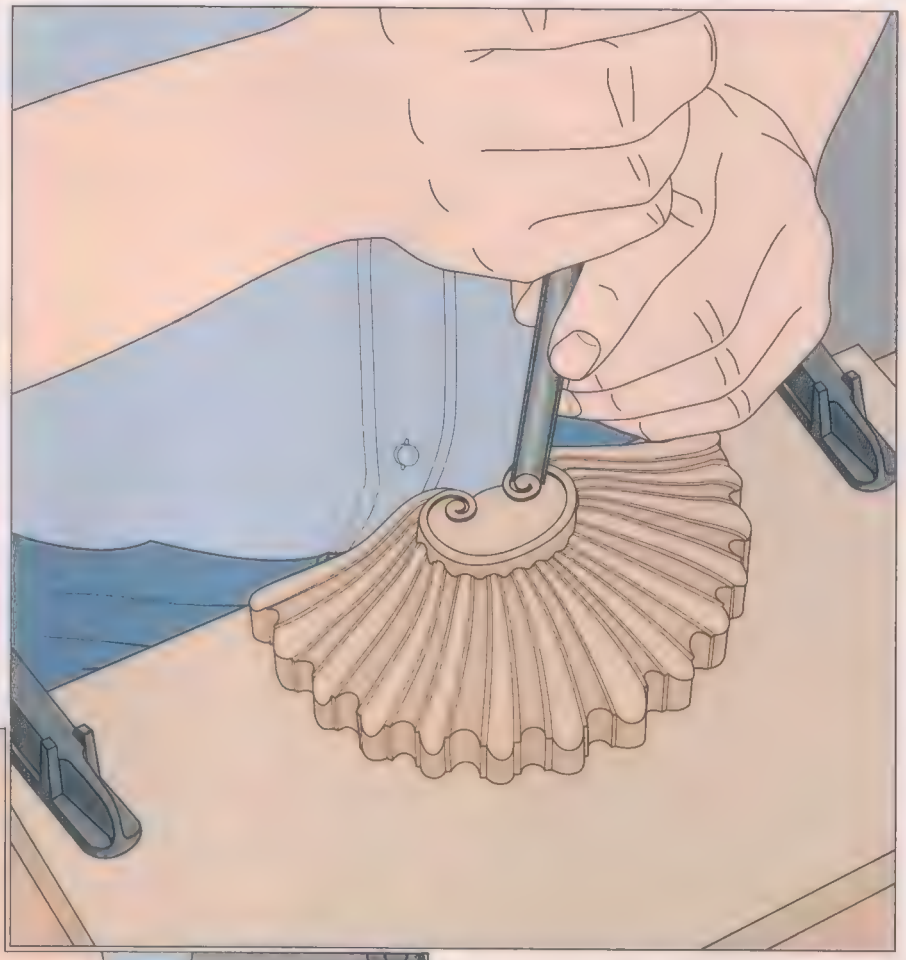
1 Defining the volute

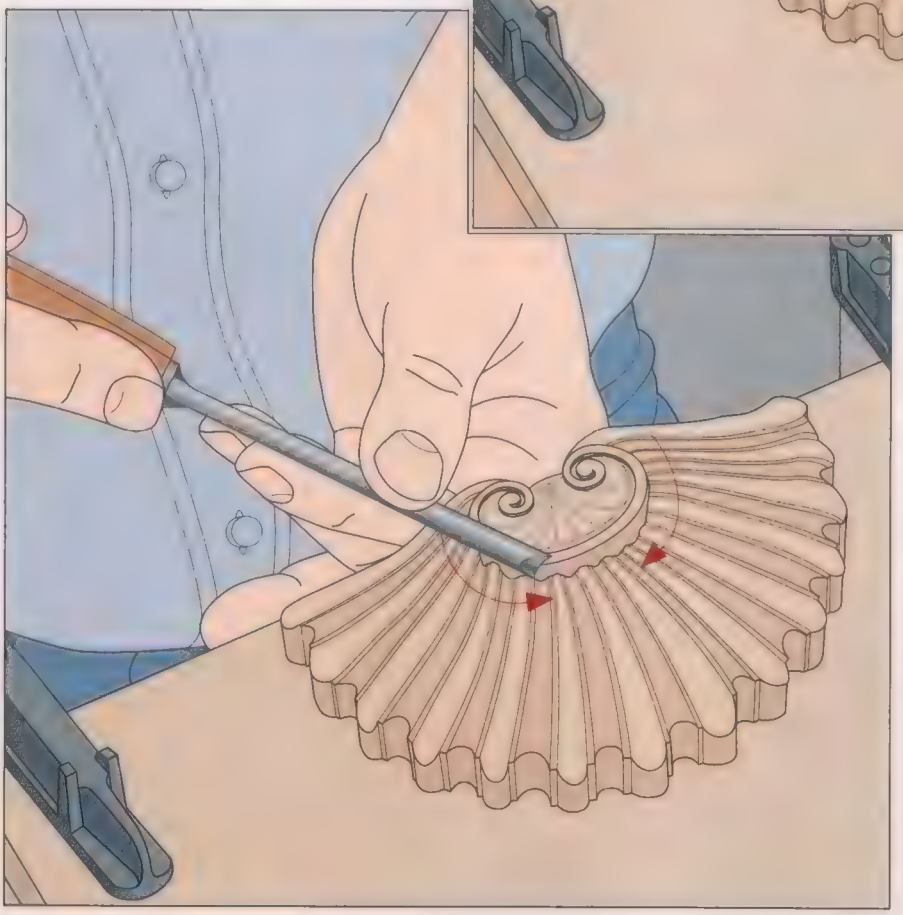
Use a carver's knife to cut along the line marking the volute. This will clearly demarcate the volute from the inner design. It also prevents tearout. Outline all of the volute except the innermost part of the spiral *(above)*. At a certain point, the waste area is too narrow and the radius is too tight to be cut cleanly. This area will be defined in a later step.

2 Recessing the inner shell

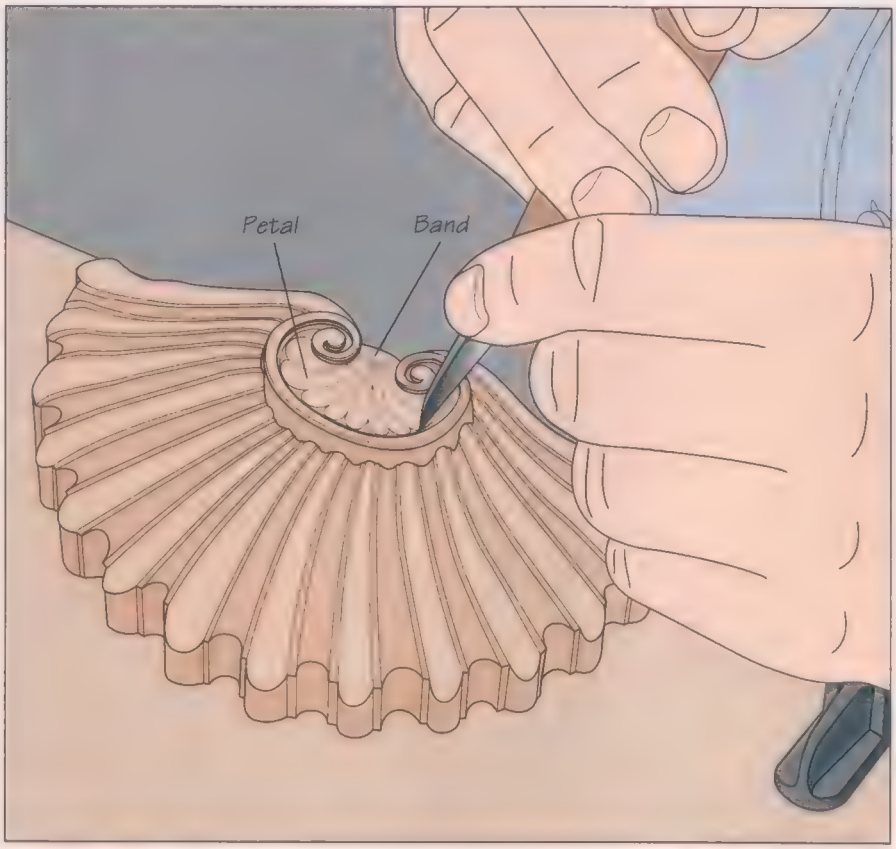
Use a V-tool to remove the waste to the volute, cutting to a depth of about ⅛ inch. Hold the tool as shown, with one hand near the tip to give you more control and prevent slipping. Work the tool with the outside edge riding in the cut made by the knife *(left)*. As before, stop when the radius of the volute gets too tight. Next, use a 6-millimeter No. 3 gouge to recess the rest of the inner shell. Cut close to the base of the volutes, but leave the fine cutting to the next step.

3 Refining the spirals
The volute ends in a spiral which is very narrow and has a tight radius. The trick is to cut the spiral with a gouge that matches the desired radius. Begin with a No. 8 and finish off with a No. 9. Hold the tip of the gouge on the cutting line and make a straight downward thrust with a slight rocking motion *(right)*. Lift the tool and set it down further along the line, overlapping the previous cut. Work to the inner taper of the volute. Next, proceed outward, outlining the remaining part of the volute. Clean up the waste surrounding the volute with a veiner and a carving knife.



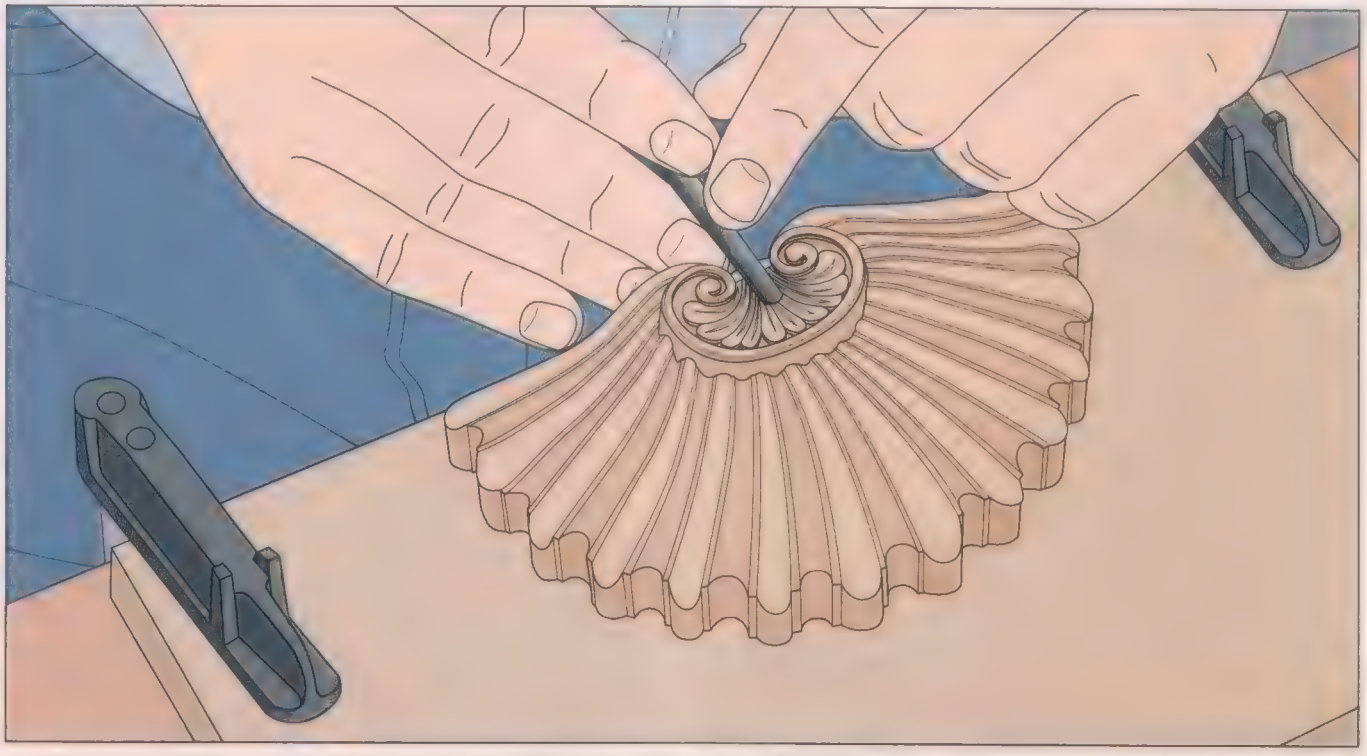


4 Rounding over the volute
Use a narrow No. 3 chisel to round over the edges of the volute *(left)*. Take very light shavings to avoid gouging the workpiece. To produce an evenly rounded form, work from one end of the volute to the other, slowly bringing it into shape as a whole. Be sure to move the tool with the grain, cutting toward the center, as shown by the arrows.



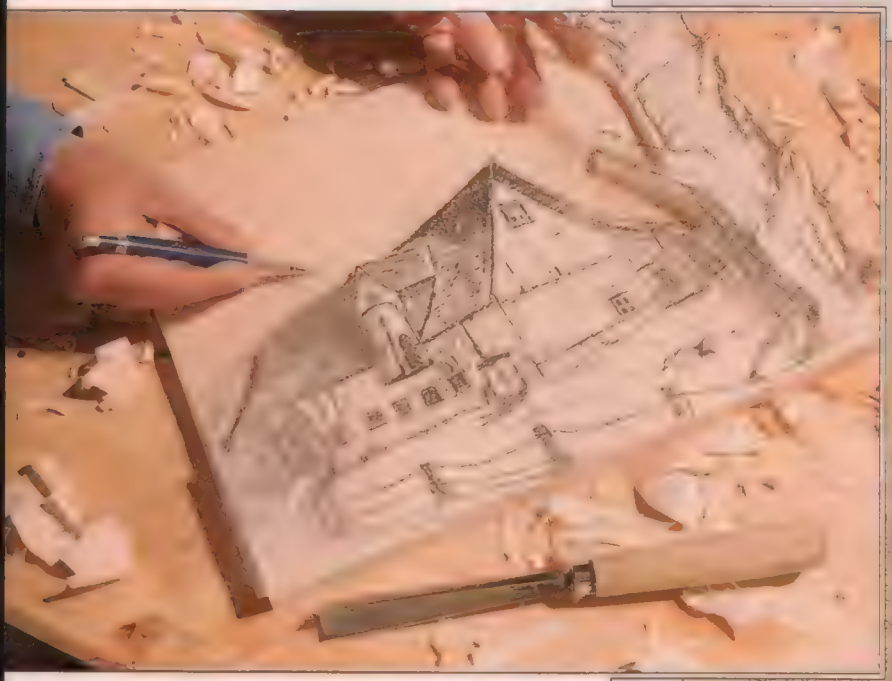
5 Removing waste between the petals
The inner shell is filled with an array of petals. The waste between the petals is removed first, and then each one is hollowed out slightly. To remove the waste use a carver's knife to outline the petals *(left)*. Stay just outside the marked line. Clean out the waste with a narrow V-tool. Also use a V-tool to cut a fine line to define the petals and also the band at the base of the inner shell.

6 Hollowing the petals
To add more detail to the carving, create a slight recess in each of the petals. With a veiner or a V-tool, start the cut from the base of the petal, pushing the tool toward the tip and stopping halfway *(below)*. Continue with a second cut, working toward the base to meet the first cut. The waste piece should pop free. Widen the recess with a couple more cuts to give it an elongated teardrop shape. Finally, round over the band slightly with a narrow chisel.



CARVING A BARNYARD SCENE

A low relief carving like the barnyard scene below is a study in the art of illusion. While the carving is actually fairly flat, the manipulation of perspective and other techniques give the appearance of depth. The process requires good planning, starting with an appropriate subject. While there are an infinite number of possibilities depending on the experience of the carver, something like this barnyard scene is a good choice for a beginner because it has a clear background, middleground, and foreground. Also, having a subject like a derelict barn makes the job easier.

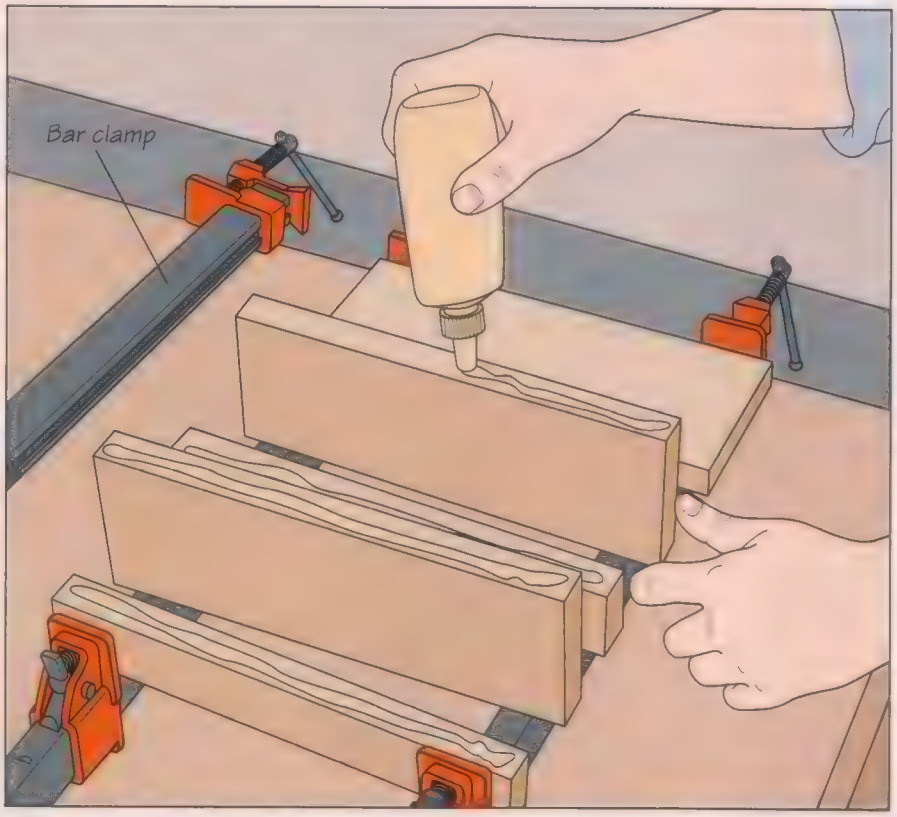


The branches of the background trees are being sketched on the nearly finished carving. Just like the shell, the barnyard pattern has been transferred to a sheet of clear acetate. This method makes it easy to sketch and resketch different elements when they are needed.

FRONT VIEW

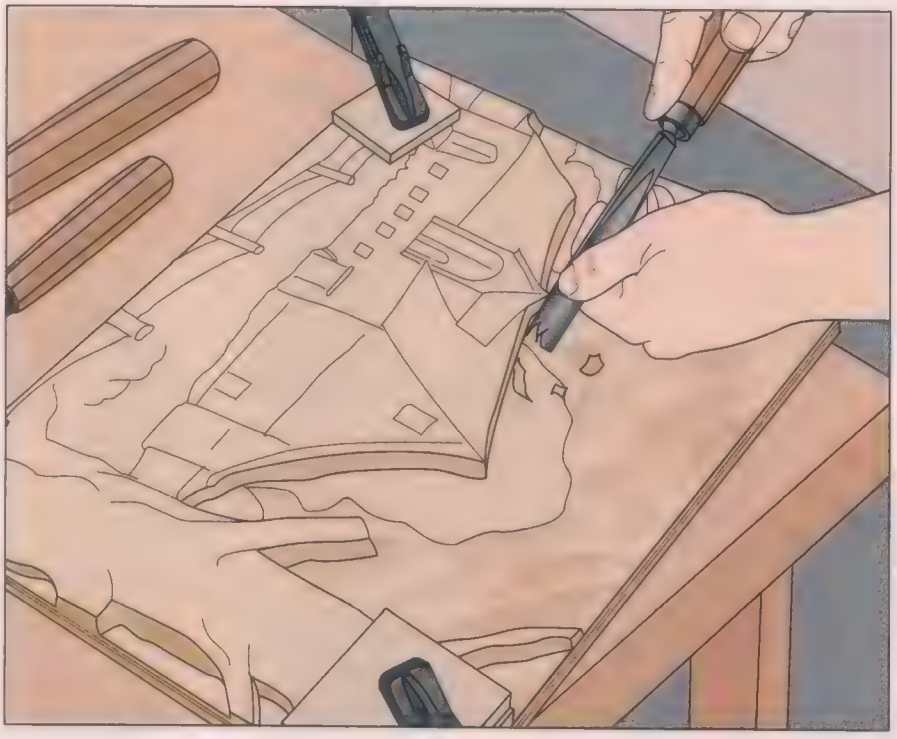
There is no need to worry too much about straight lines and crisp detail. The subject invites you to take a softer approach. Whatever the subject, reproduce it on acetate. This will save hours of resketching and greatly increase your accuracy *(see page 70)*. Take the time to study your sketch to determine the hierarchy of elements. In the barnyard example, the lowest location is the sky followed by the background trees. The foreground should slope toward the barn. The dead tree is the highest element of the carving. These and other techniques are explained on the following pages.

CARVING THE BACKGROUND



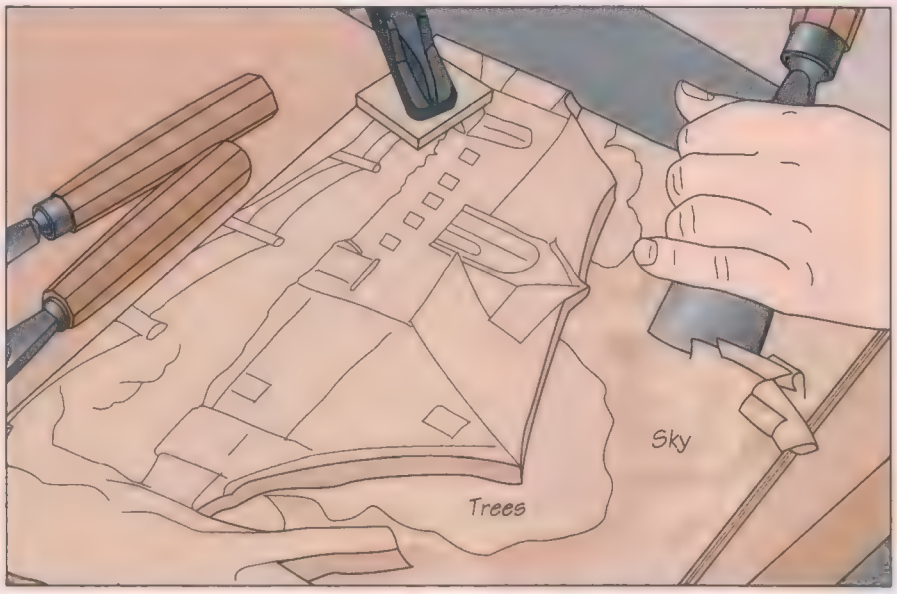
1 Gluing up the blank

As with all woodworking projects, wood movement is an important consideration when planning a relief carving. A wide panel is particularly prone to warping. You can solve this problem by edge-gluing several narrow strips to make the carving blank. Select pieces of ¾-inch-thick basswood with straight grain and no figure. This will make for invisible joints as well as easy carving. After jointing the boards to produce a straight edge, place them on a pair of bar clamps and choose the best match to produce a seamless-looking blank. Turn all but the first board on edge and apply a bead of glue *(left)*. Reposition the strips flat on the bar clamps and tighten them. Apply a third clamp across the top of the assembly. Tighten all the clamps evenly. After the adhesive has cured, trim the blank to the desired size. Finally, use a piece of acetate to transfer the design to the blank, as shown on page 72.

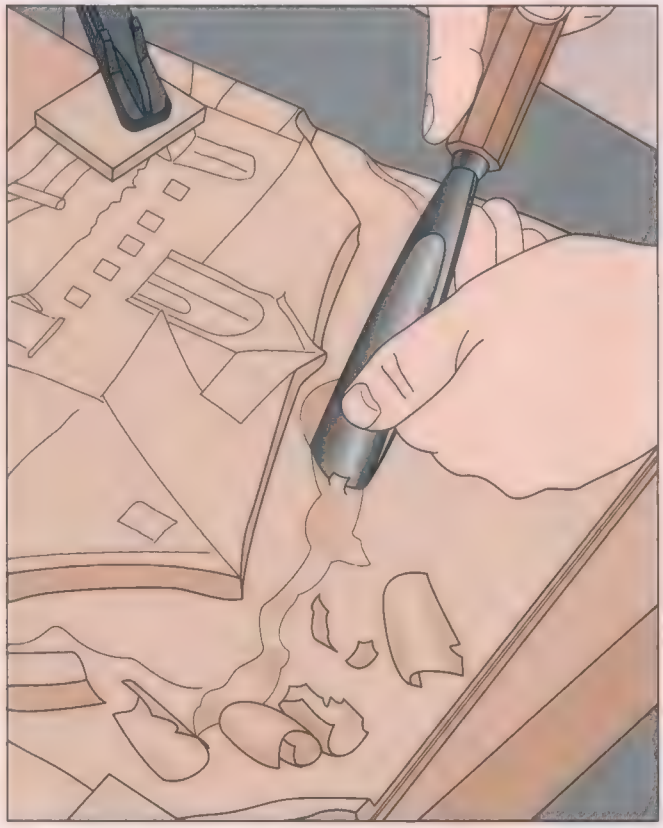


2 Defining the background

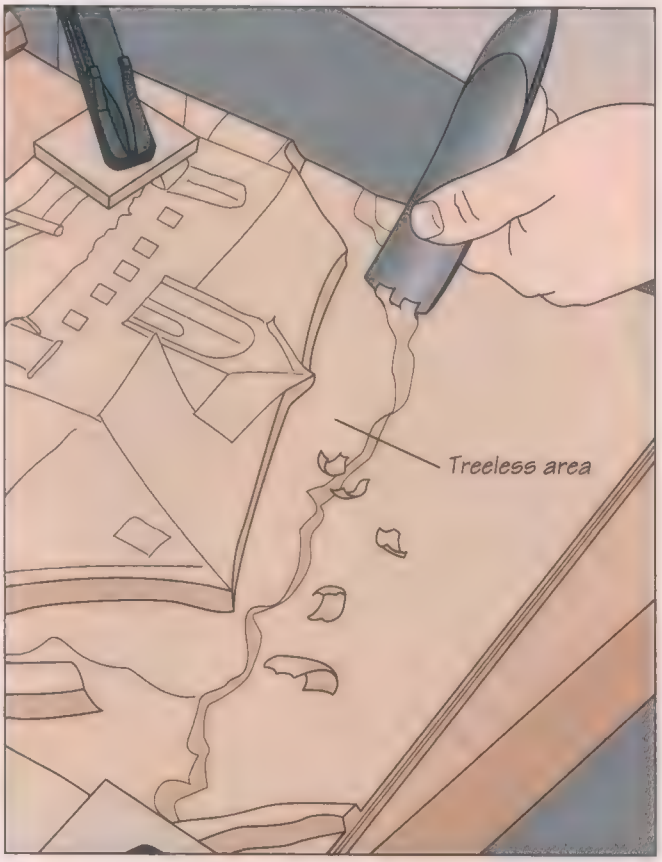
The background is created by removing waste wood from this area to the correct depth. The background has two levels, the trees and the sky. Mark two lines along the edges of the blank ¼ and ⅜ inch below the carving surface. Begin by lowering the entire background to the tree level, ¼ inch below the surface. Define the limits by making a cut with a V-tool along the tree and the barn *(right)*. Do not outline these elements by cutting straight down with a hammer and chisel. This crushes fibers, making it impossible to create a clean cut. Reach the final depth in several passes.



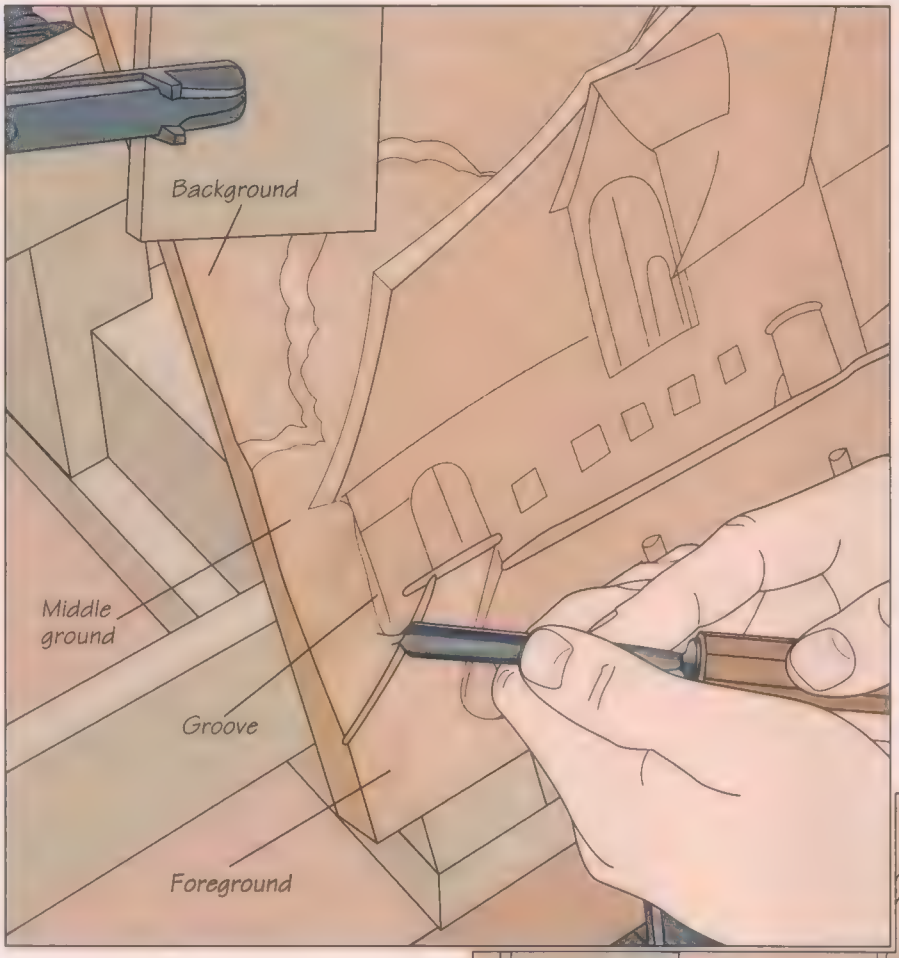
3 Lowering the background
With a 35-millimeter No. 3 gouge remove the waste to lower the background *(left)*. Work across the grain for easier control of the tool, removing the waste in thin shavings. Alternate between this and the previous step until you reach the line marking the first level.



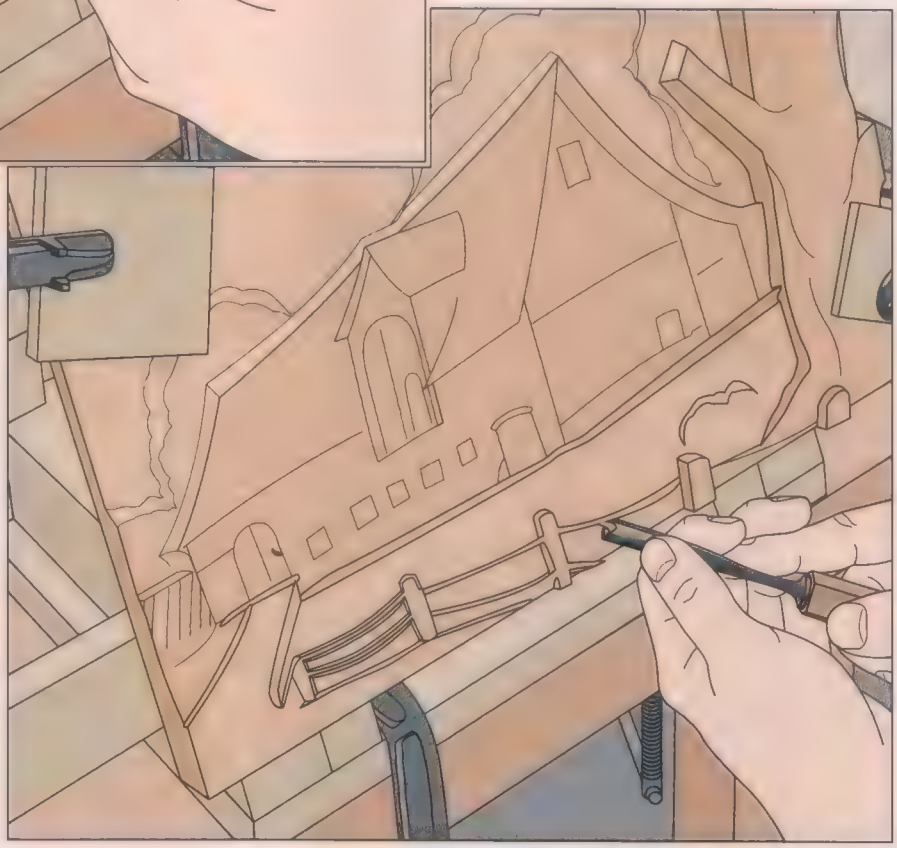
4 Defining the background trees
Use the transparency to redraw the treeline. Next, define the trees by lowering the sky just beyond their outline by another ⅛ inch with a No. 8 gouge *(above)*. Then use a wide No. 3 gouge to lower the entire sky area to its final level.



5 Blending the trees into the sky
Round over the edge of the tree level to imitate the shape of a real treeline. Use a medium No. 6 gouge to smooth the edges where they meet the level of the sky.

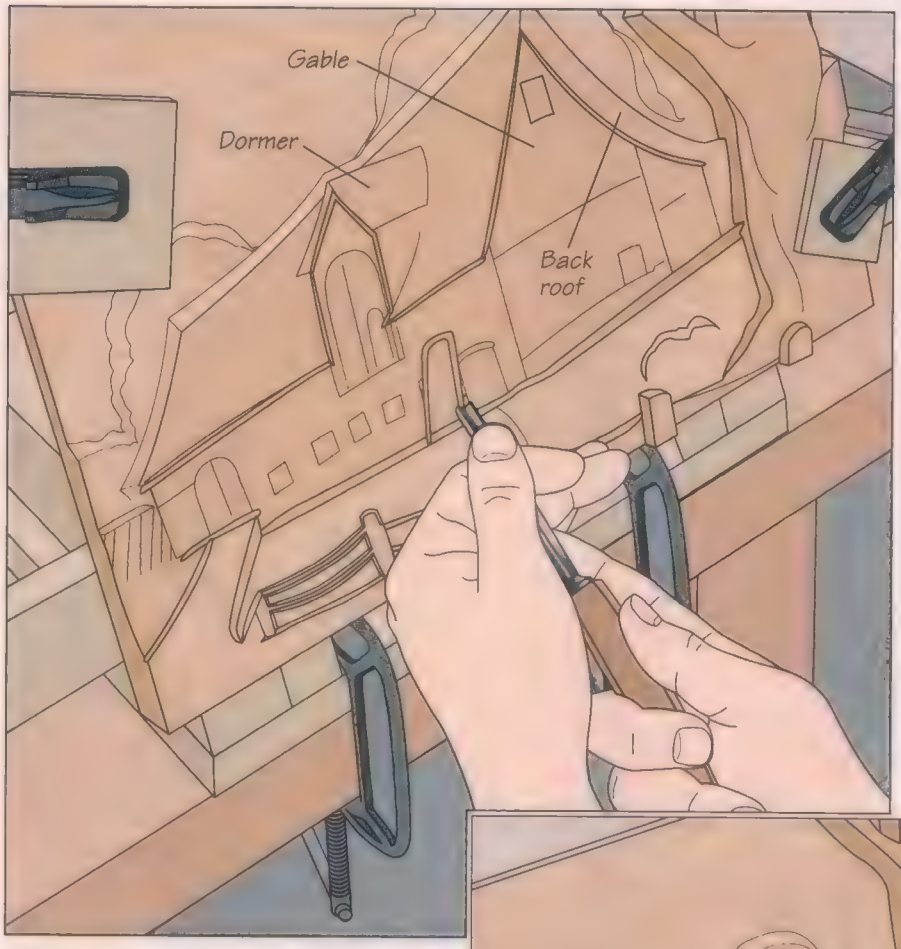


2 Carving the left landscape
The ground to the left of the barn slopes from the road all the way to the horizon, dropping slightly from foreground to middleground to background. First define the left wall of the barn by cutting a groove with a V-tool *(left)*. Then use a No. 3 gouge to remove the waste.

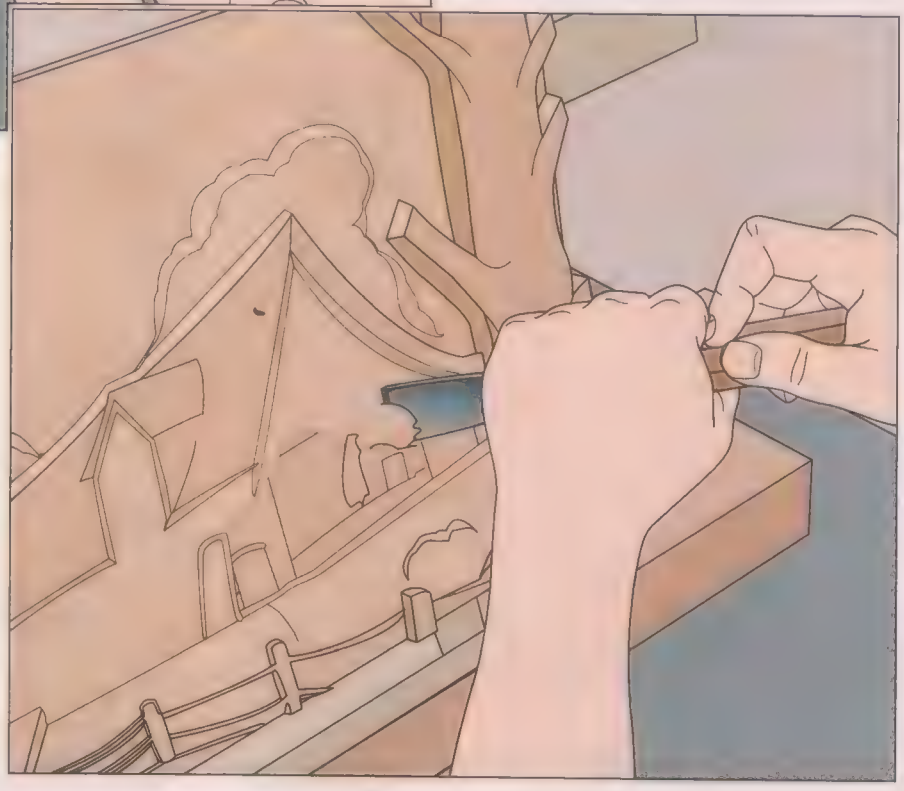


3 Sloping the main foreground
Prepare the foreground for carving by isolating those elements that must remain at full height, in this case, the rocks and the fence. At this stage you do not have to be too precise; cut as close as you feel comfortable with a V-tool *(right)*. Next, slope the foreground toward the barn. At the very front, remove just enough wood to allow the fence to stand out. From there, work toward the barn, cutting slightly deeper as you go. Since you have already made a V-cut just below the base of the barn, the waste pieces should pop free.

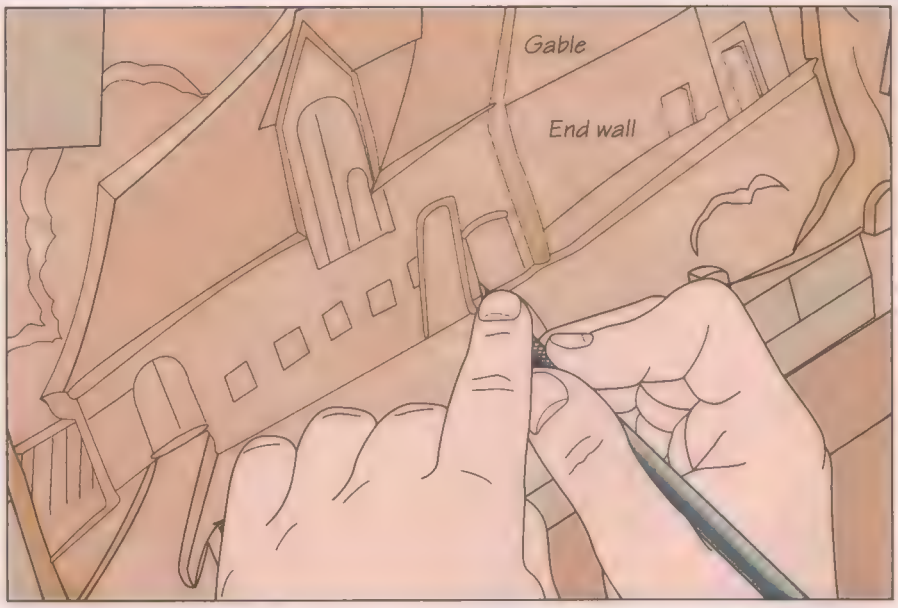
CARVING THE MAIN ELEMENTS



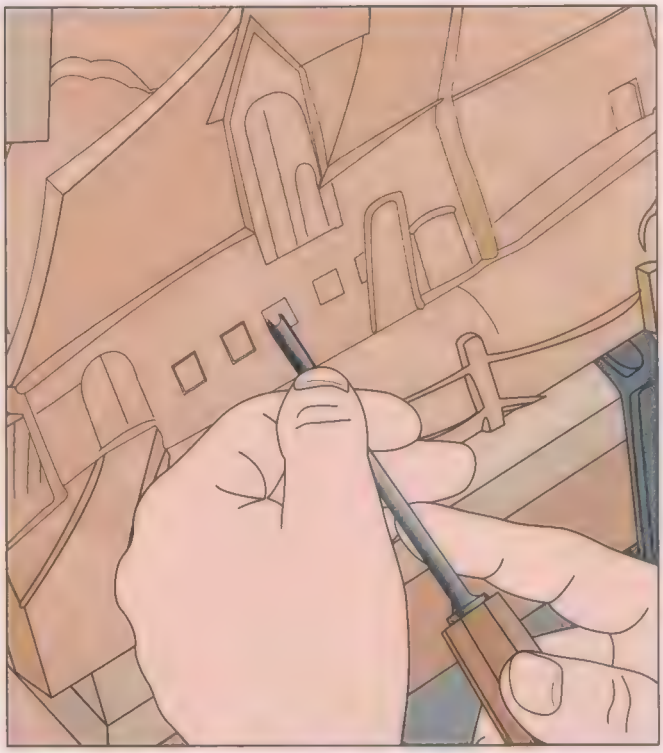
1 Defining the features of the barn
The outline of the barn was carved in the previous steps. Now use a V-tool to isolate the different elements that will stand out from the barn. Since the walls will be lower than the roof, identify the roof first. Use the V-tool to remove the waste from just below the roof line. Work along the edge and into the point of the gable. The groove should stop before the peak, allowing for the overhang of the roof, which extends past the gable. Cut a groove to define the back part of the roof on the right. Be sure to leave it at least a ¼ inch thick to let you detail it later. Also define the inside of the dormer. The boards leaning against the wall are an added little touch. Cut around them with a V-tool *(left)*.



2 Lowering the walls
Lower the walls to a uniform depth. Use a No. 3 gouge to remove the waste, working perpendicular to the grain wherever possible *(right)*. This will make it easier for you to control the depth of cut and prevent the blade from digging into the wood. For the peak and other tight spaces, use a No. 2 skew chisel. Finally, redraw the barn details with the help of the acetate.

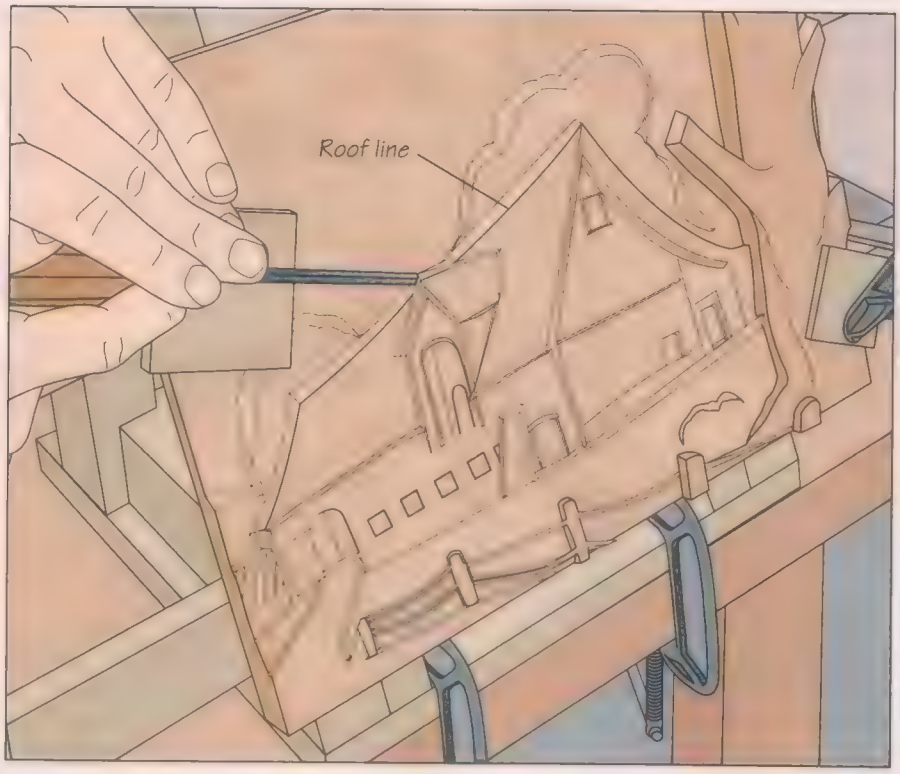


3 Defining the doors and windows
Use a craft knife or scalpel to define the doors and windows. Hold the blade perpendicular to the wood and cut smoothly along the line to the correct depth *(left)*. Cut each line in two strokes, starting at each end and working toward the middle. This will allow you to cut cleanly into the base of each corner with the tip of the blade. Use your free hand to guide the blade. Also make a staggered cut along the line separating the end wall from the gable. This will mark the point where the siding boards on the gable overlap the ones below *(see photo, page 92)*.



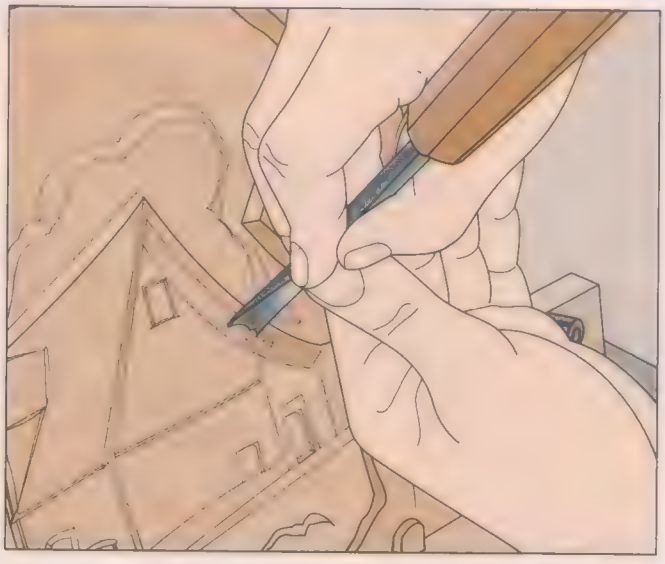
4 Recessing the windows and doors
Use a No. 3 gouge to remove the waste inside the windows and the doors. Cut with the grain, allowing the waste pieces to pop free *(above)*. Shave all the recesses to the same depth. Finally use the skew to slope the top ½ inch of the end wall into the line you cut in the previous step to give the illusion of the top boards overlapping the lower ones.

5 Sloping the roof
Separate the elements of the dormer from the main roof with a cut of a V-tool. To give an illusion of depth, the main roof must slope away at a slight angle from the bottom right to the top left. The edge of the roof—from the right peak, down the front, and along the eaves—must be left at its full thickness. Use a wide No. 3 gouge to remove the waste and slant the roof. Take out thin shavings to create an even slope that ends in a 1/16 inch thickness at the top left corner.



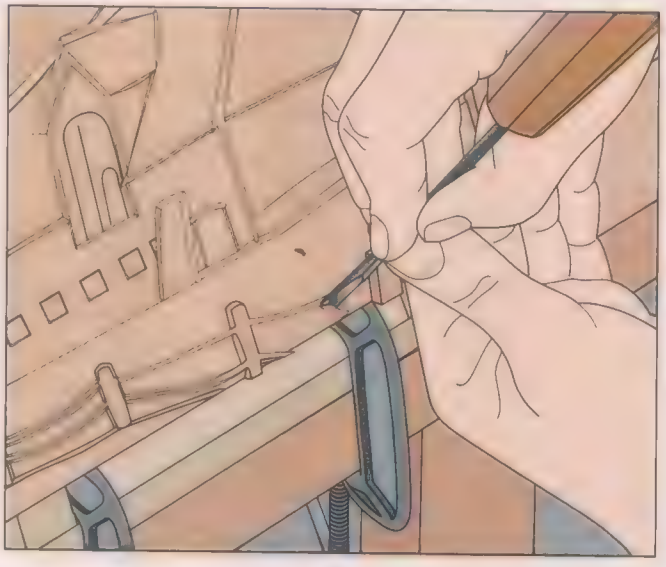
6 Cleaning up the roof line

Outlining the barn will have left a slightly ragged edge that needs to be cleaned up. First, use a 6-millimeter No. 2 gouge to undercut behind the peak of the dormer roof where it extends past the main roof line *(left)*. Then, with a wider No. 2 gouge, shave the roof line down to its proper size, undercutting slightly to form a sharp edge.



7 Trimming the overhang

The overhang helps adds an illusion of depth to the carving. It is defined by the exposed underside of the back roof. When the walls were first lowered *(page 86, step 2)* the far roof was left fairly thick; now is the time to trim it. Use a No. 3 or No. 4 gouge 16 millimeters wide or so to trim the roof. Cut away the waste with slightly angled downward cuts *(above)*. Take away very thin shavings to make a clean cut and avoid crushing the fibers.

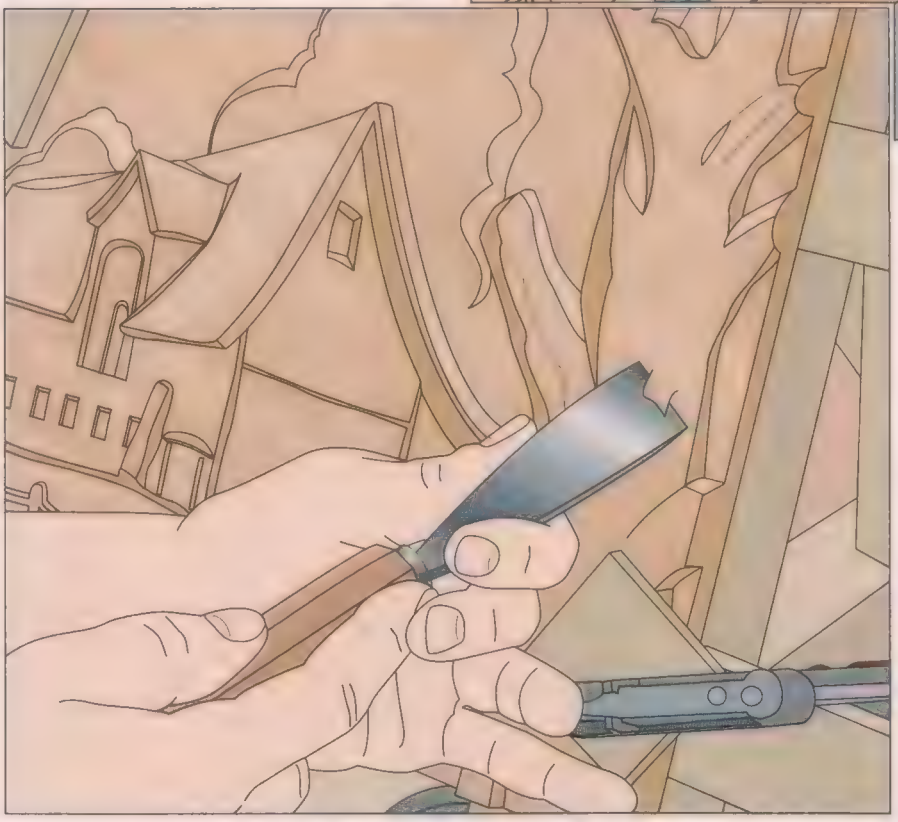


8 Refining the fence posts and rails

The fence posts and rails that were given their basic shape in step 3 need to be cleaned up. You can do this with a 6-millimeter No. 3 gouge, carefully paring away thin slivers of waste until the outline is sharply defined. Then use the tool to round over the small blocks that represent the foremost fence posts, which were glued on in step 1 at the foreground stage *(page 84)*.

REFINING THE TREE SHAPE

1 Defining the branches
Unlike the barn, which demands crisp lines, the tree needs a softer look. First, define the branches. A common mistake is to have all the branches stick out from the side of the trunk. In reality some branches should start on the front face of the tree. This can be done by carving the crotch of a branch into the front of the trunk with a few strokes of your V-tool *(right)*.



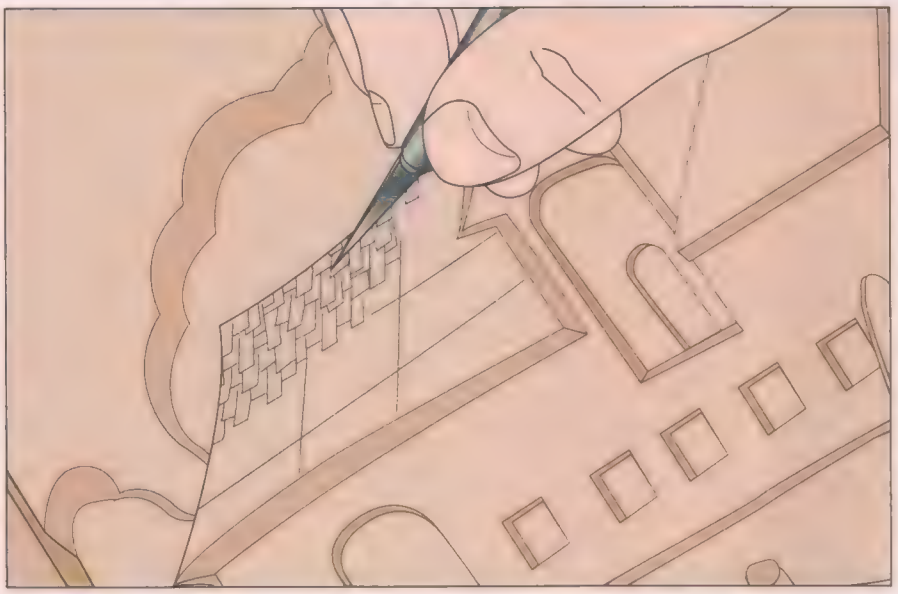
2 Contouring the tree
The branches and trunk can be shaped with No. 3 and No. 4 gouges of different widths. Do not just round over the edge, but arch the whole width of the trunk. Work from the centerline of the trunk toward the edges *(left)*. Increase the radius slightly as you approach the edge. When rounding over the branches, be sure to work with the grain to avoid digging into the wood too deeply.

A small craft knife is used to undercut a shingle. This technique creates the look of overlapping pieces and is useful for other types of carving, such as certain bird feathers. Many carvers prefer to use a surgeon's scalpel with replaceable blades, available through medical supply houses. Experienced carvers can expertly fill a roof with shingles by eye. Beginners, however, will find that an accurate drawing showing the proper size and layout of the shingles is invaluable. You will have to redraw frequently to compensate for the undercutting of each row, which will remove some of the pencil lines.

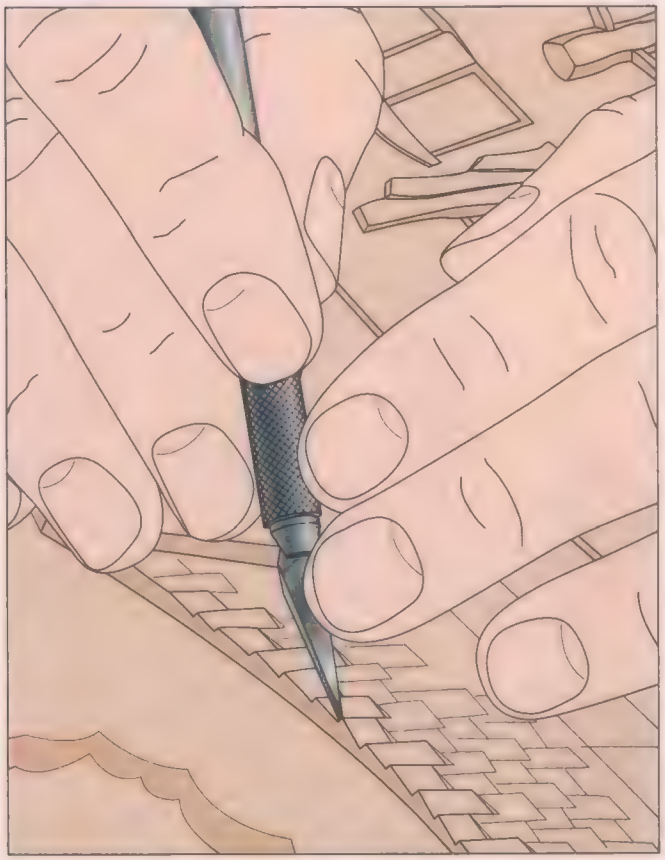
CARVING THE SHINGLES

1 Laying out the shingles

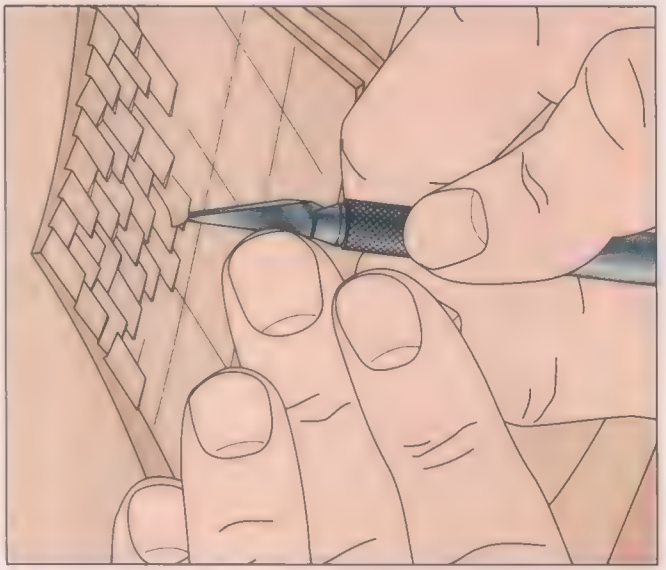
The shingles get slightly smaller as they move from right to left. To help orient the shingles, draw some horizontal and vertical perspective lines. Next, fill in the shingles referring to the drawing. It may be possible to use the transparency, but for fine details this often proves difficult. Try to keep the same number of shingles between the lines, making them correspondingly larger as you move to the right. Remember that the shingles do not line up evenly along their bottoms, but are staggered.



2 Cutting the outlines
Starting with the top row, cut the outlines of the shingles to define them. Holding the knife like a pencil, cut straight down into the wood along the lines *(left)*. Do not worry about cutting too deeply; the following steps determine the amount of waste that will be removed.



3 Angling the shingles
Angle all the shingles to make them stand out and give the roof texture. Holding the knife at the correct angle, use your free hand to push the blade through the wood *(above)*.



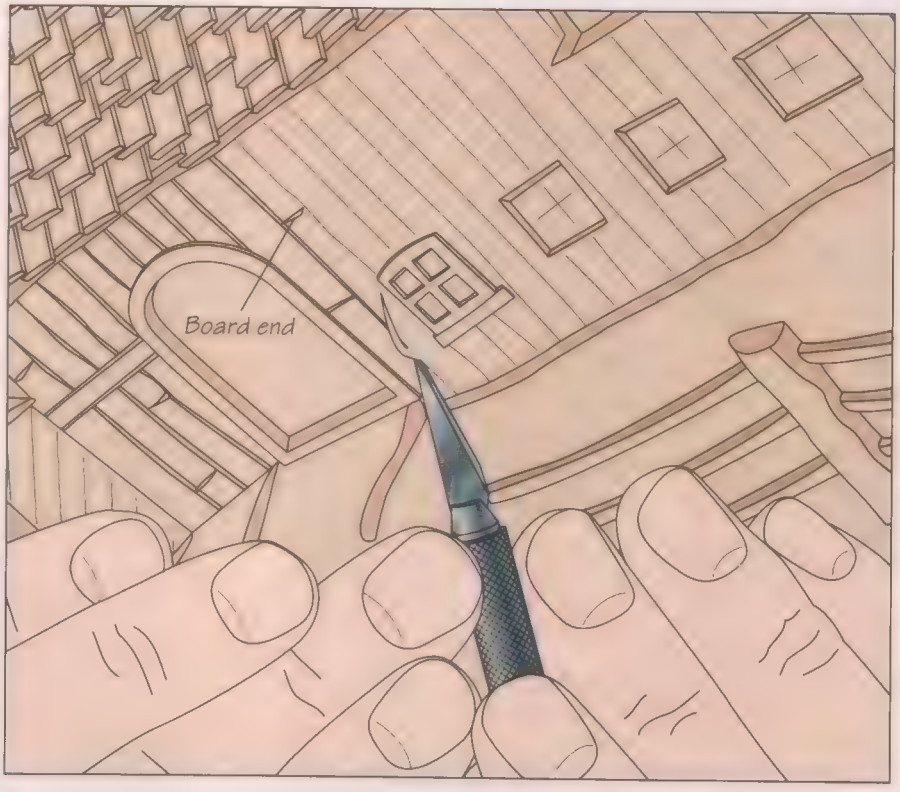
4 Undercutting each row
To give each shingle the correct slope, undercut each row right after cutting and angling it. This will set up the next row at the right pitch. Hold the knife fairly flat against the roof and slide it along the row. Rely on your free hand to push the blade into the wood *(above)*. Keep the heel of this hand on the roof to give you maximum control and prevent cutting into the previous row. Take just a fine shaving. A common mistake is removing too much waste. Also remember to angle the cut slightly, starting slightly above the lower edge of the shingles. The highest point of all the shingles should be the original surface of the roof. Once the undercutting is complete, repeat steps 2 and 3 to form the shingles in that row.

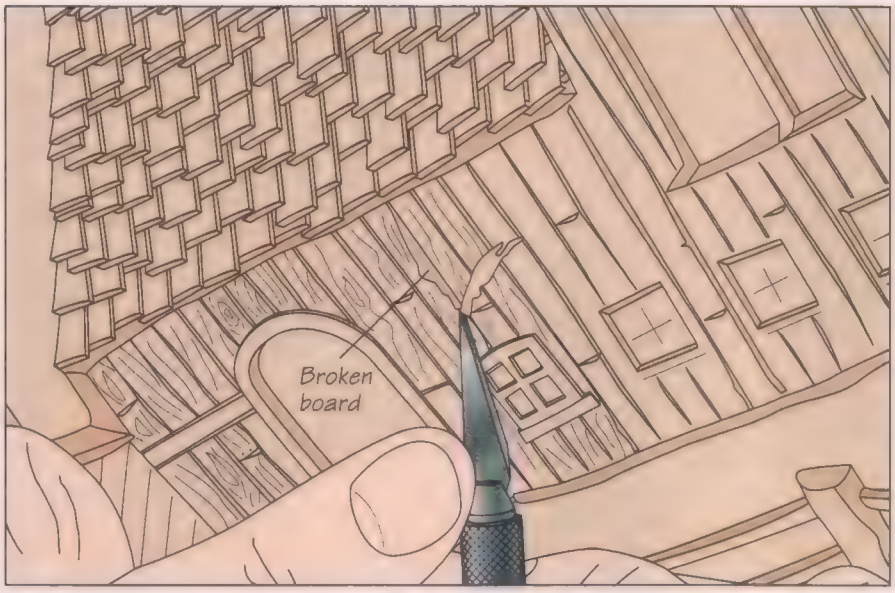
The panes of a window are delineated by cutting two crossing lines. Make each line with intersecting angled cuts to remove the waste in tiny strips. Notice how the lower wall boards have been recessed slightly toward the staggered ends of the upper gable boards. This makes the upper gable boards appear to overlap the lower ones. Each window frame has been outlined with a knife and the surrounding wood sloped toward it.

DETAILING THE MAIN ELEMENTS

1 Defining the boards

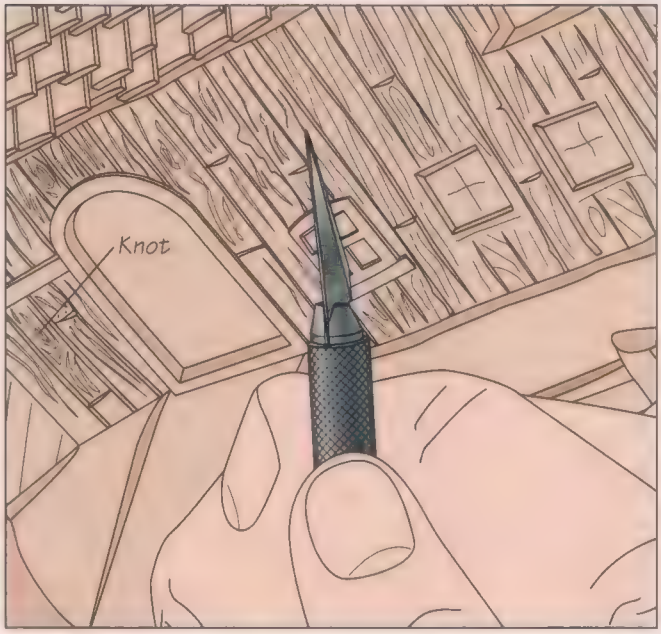
The barn boards are separated from each other by taking out an extremely thin wedge of waste wood between them. To remove the waste in two strokes, first cut along the board line then make a matching cut at a slight angle to release the waste *(right)*. As you appoach each window, first outline the frame with your knife, then recess the nearby wood toward it to create a raised effect.





2 Adding imperfections

Incorporating small details will give your carving a more realistic look. One trick is to make some of the boards appear broken or missing. To break a board, first outline the jagged line, cutting along its length. Next, shave away most of the waste with an angled cut *(left)*. Use a combination of intersecting vertical and horizontal cuts to clean out the waste. Other ideas are to create broken window panes or a hole on the roof. Remember that for any of these effects you need to make only a very shallow cut.



3 Texturing the wood

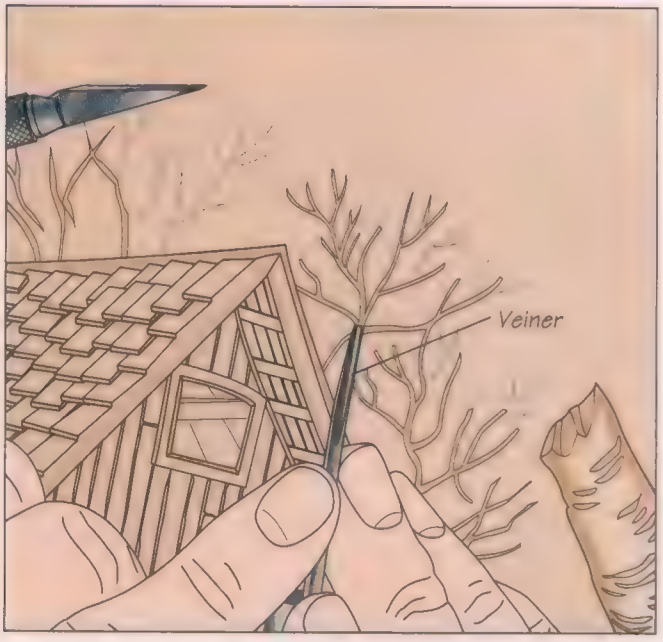
Texture the wood to resemble its grain with downward slices of the knife. Make some straight-grained and some wavy lines. Add small holes to represent knots. Double piercings in each board end can simulate the look of nail heads. To make the grain cuts, hold the knife like a pencil and carefully slice the patterns. Do not remove any waste. The effect of this procedure may seem almost invisible at first, but it will be much more noticable after finishing because the cuts will absorb more stain and darken *(photo, page 130)*. Add grain marks to the fence posts and rails as well as the shingles.

4 Detailing the tree

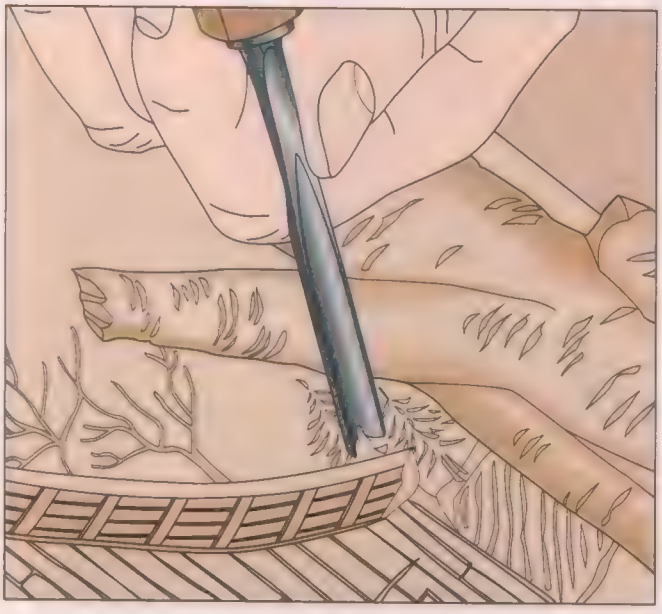
Each species of tree has its own individual look. The tree in this project is a birch, which features dark horizontal scars. Some broadleaf trees, like maple and oak, have deeply grooved bark, while some pines have overlapping, scale-like bark. Represent the scars on the birch tree by taking very fine cross-grain cuttings with a 6-millimeter No. 11 gouge *(above)*.

A daisy punch adds a flower motif to the carving of the old barn. Punchwork creates the important final details, like flowers, leaves, and grass that are too fine to be made with knives and gouges. The tools are available from some woodworking stores and leather suppliers, or you can fashion your own (see page 95).

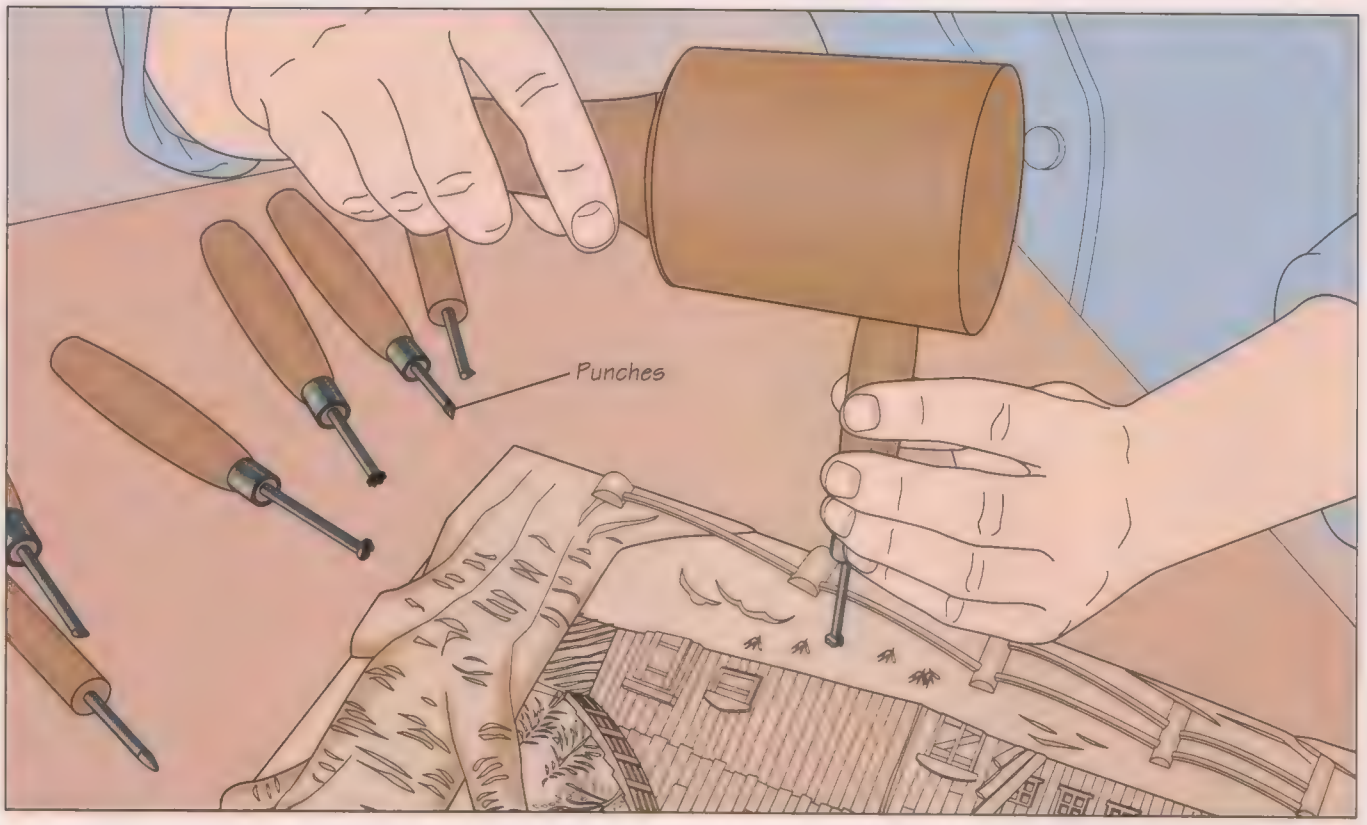
ADDING FINAL DETAILS



1 Carving the background trees
Trace the design on the acetate to draw the background tree branches. With a fine veiner, groove out the branches, taking a slightly larger cut for the bigger limbs. Hold the veiner in two hands to give you maximum control *(above)*.



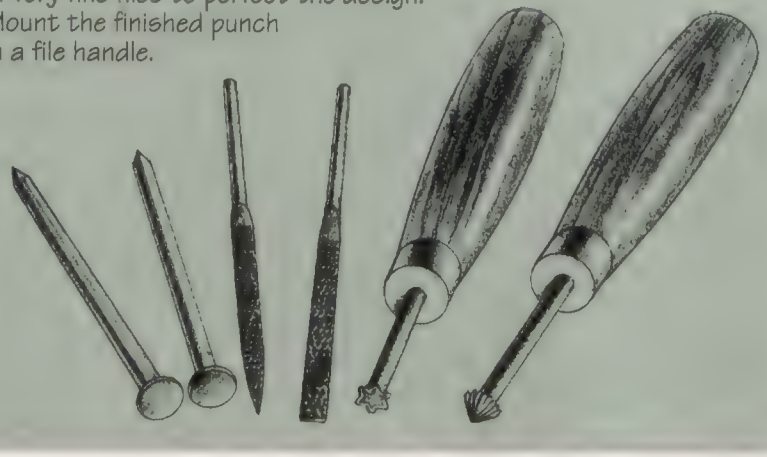
2 Making pine trees
With a bit of experience it is easy to make background pine trees with a V-tool. Practice first on a scrap board. To make the tree shape, start at the top, then "walk" the tool downward, alternating pressure from side to side. Because of its simplicity, this form is best kept fairly small, and placed in the background.



3 Detailing with punches
A variety of punches can be used to detail the carving. Use one or two sizes of leaf-shaped punches to decorate the background trees. To make each leaf, hold the punch in the appropriate place on a branch and tap it lightly with a mallet. Rotate the punch so the leaves are not all oriented the same way. Also, change the angle of the punch slightly from leaf to leaf. This will cause all the leaves to reflect light a bit differently, creating a shimmering effect. Use the grass punch in the foreground to create clumps *(above)*.

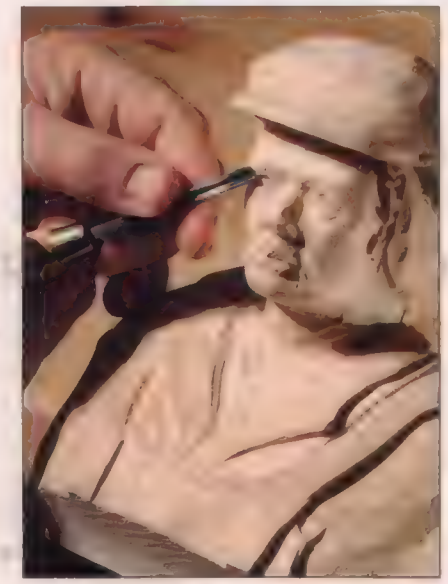
SHOP TIP

Shop-made punches
Many punches can be made in the shop from nail heads. To make a punch, mount a 16d common nail in a vise. Scratch the desired shape on the head then rough it out with a regular bastard file. Use a set of very fine files to perfect the design. Mount the finished punch in a file handle.



CARVING IN THE ROUND

The goal of carving in the round is to create a free standing work that can be viewed from all sides. Of course the challenges of carving a fluid, expressive form are many, since working in three dimensions is conceptually more difficult than working in two, but the rewards are also great. Carving in the round, a woodworker crosses the line into the area of sculpture with a beguiling mixture of art and artisanship. This chapter presents two projects: a decoy and the more challenging form of a human bust.



A carver defines one of the eyebrows of a bust of an old carpenter with the help of a 4-millimeter No. 11 gouge. Using the standard proportions of the human face, you can produce graceful replicas of real people, or expressive characters from your own imagination.

Although there are great variations in a human face, or for that matter, the shape of a duck, there are certain constants. Knowing them will allow you to carve a more realistic representation. For example, the eyes in a human face lie exactly in the middle of the face, between the bottom of the chin and the top of the head. Variations, such as placing the eyes slightly above or below the center line will effect subtle changes in a person's expression.

When measuring in carving, it is better to use an arbitrary standard—for example, the distance of the eye from corner to corner—as a unit of distance, rather than relying on the absolute measurement of a ruler, as in cabinetmaking. This tends to integrate the elements of the subject, producing a more faithful reproduction. The actual measuring is done with dividers.

In choosing wood, remember that all but the smallest carvings will require gluing up a blank from thinner pieces. Practical reasons for this include the time required for seasoning. A 6-inch cube of solid wood will require six years to season properly. Gluing up the same size piece from several 1-inch-thick pieces will allow you to use wood that has been seasoned for only a year. A carving blank made from thin pieces of wood glued together will remain very stable, less prone than a solid piece to dimensional changes with shifts in temperature and humidity. Also, using thin pieces of wood allows you to choose stock with a minimum of imperfections. A solid block of wood may conceal unpleasant surprises.

The chapter begins with carving a replica of a female bufflehead duck *(page 98)*. Preparing the blank begins on page 100, followed by the basic shaping of the form and adding the major feathers. Forming the head begins on page 103. The last stages of carving a duck are discussed on pages 104 and 105. This includes attaching the head and woodburning the feathers.

The more challenging carving of a human bust begins on page 106. Preparing the blank is described starting on page 108, followed by a section on creating the rough form of the bust. The final part of the chapter deals with the detailed carving work *(page 115)*.

This reproduction of a female bufflehead duck is a good project for someone inexperienced with carving in the round. It was finished and detailed with acrylic paints (see page 136).

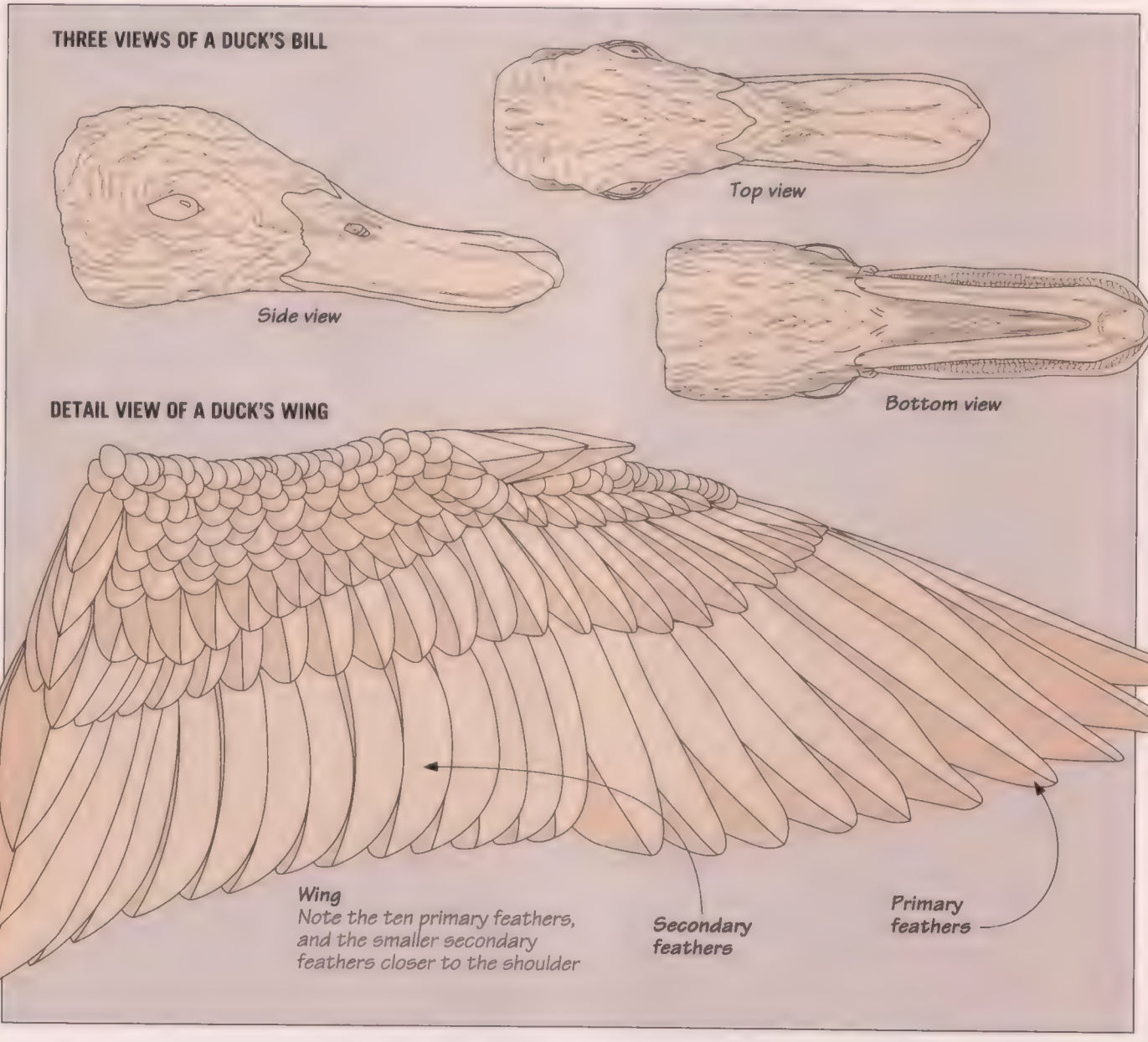
CARVING A DUCK

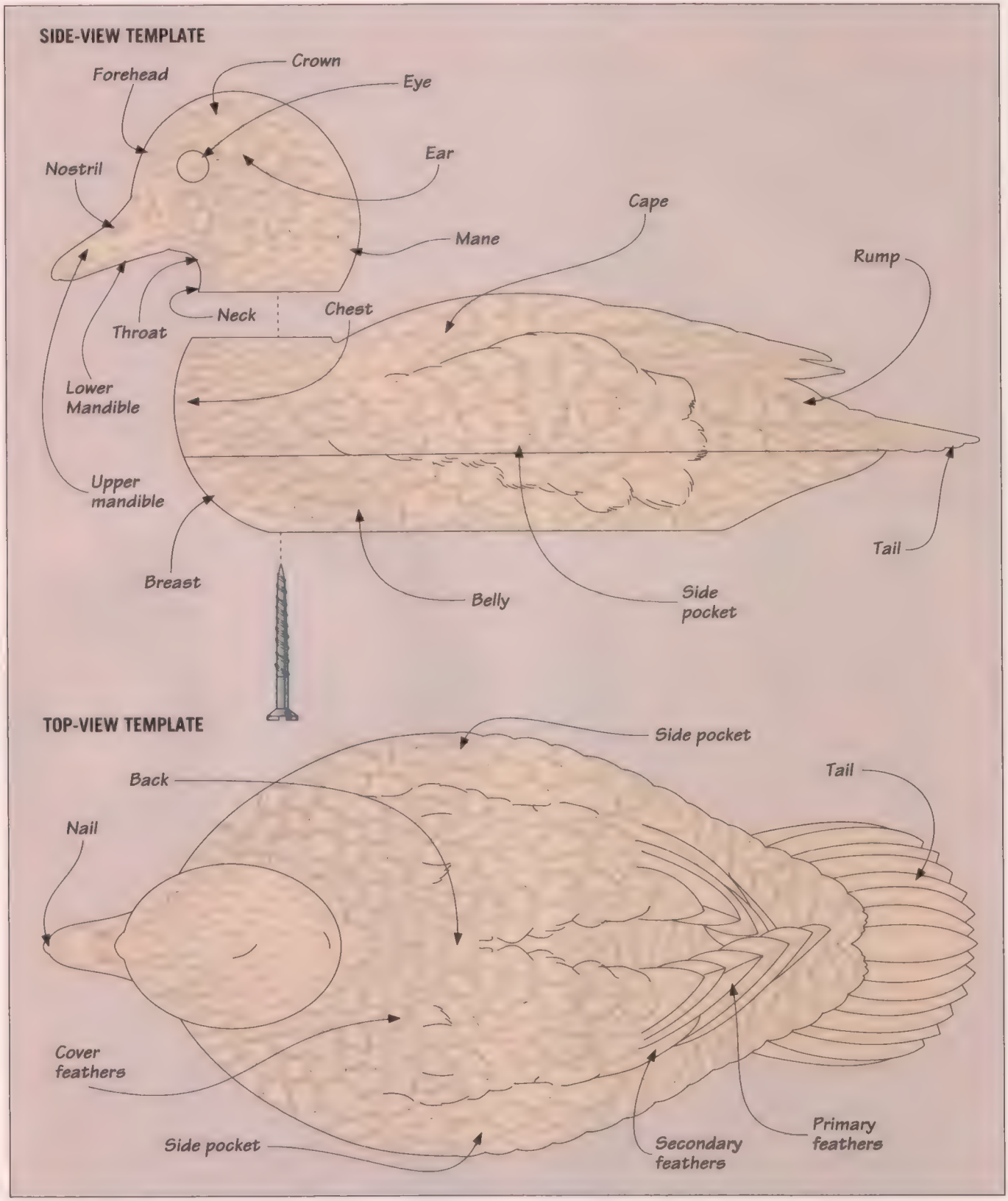
Wooden replicas of ducks and other wildfowl originated around the middle of the Nineteenth Century as decoys to attract birds to hunters. Today, carved lifelike decoys are also valued collectors' items.

The duck shown in this section is based on the actual proportions of a female bufflehead. For that reason, the templates and diagrams below are intended as precise guides. You can, however, create a more fanciful creation. Following the steps here will sharpen your control over your carving tools and develop your sense of volume and space—all of which are critical to carving in the round.

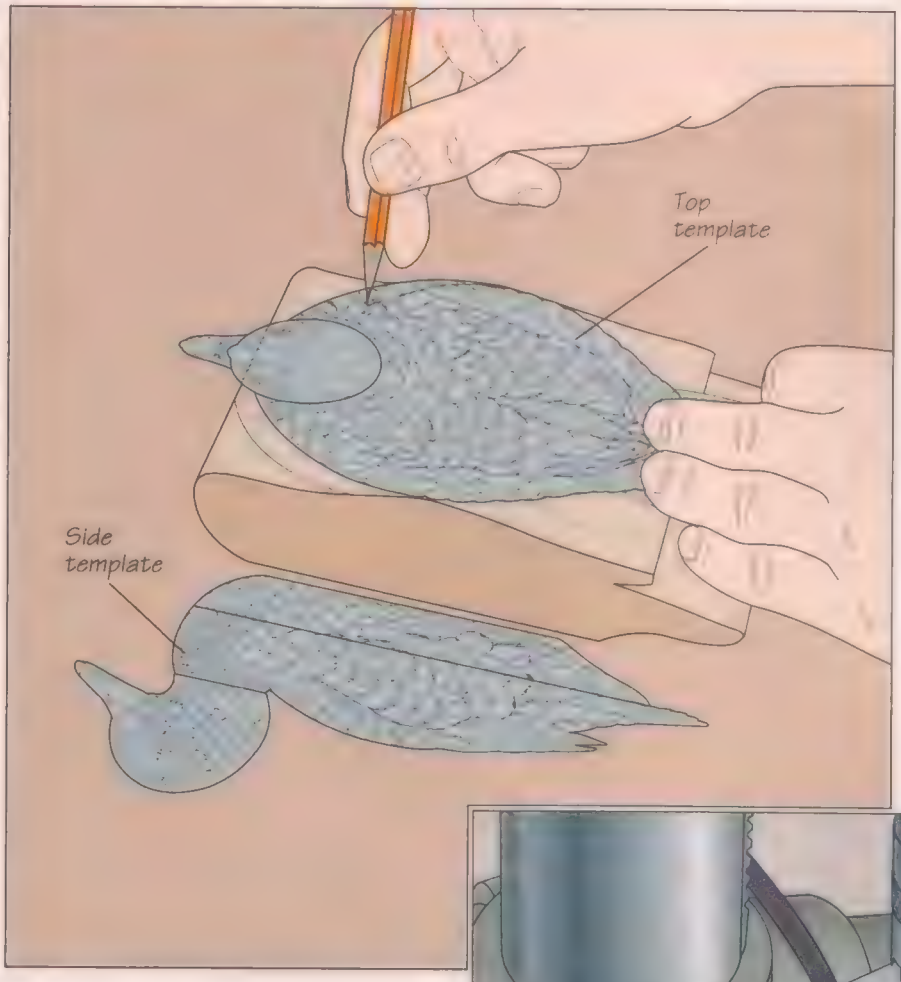
The underside of a duck's bill is a relatively complex structure. Use the illustration below to guide you. A spread duck's wing is also included, so you can better understand the structure of the folded wing shown on the templates.

Some specific parts of the duck may be less familiar. The nail is the hard point on the tip of the upper and lower mandibles of the duck's beak. The side pocket is the bulge of the duck's body that lies beneath the wing and shoulder structures. The primary feathers always number 10 on each wing, and are what the bird uses to fly. The secondary feathers are the smaller and more numerous feathers that fill out the wing.

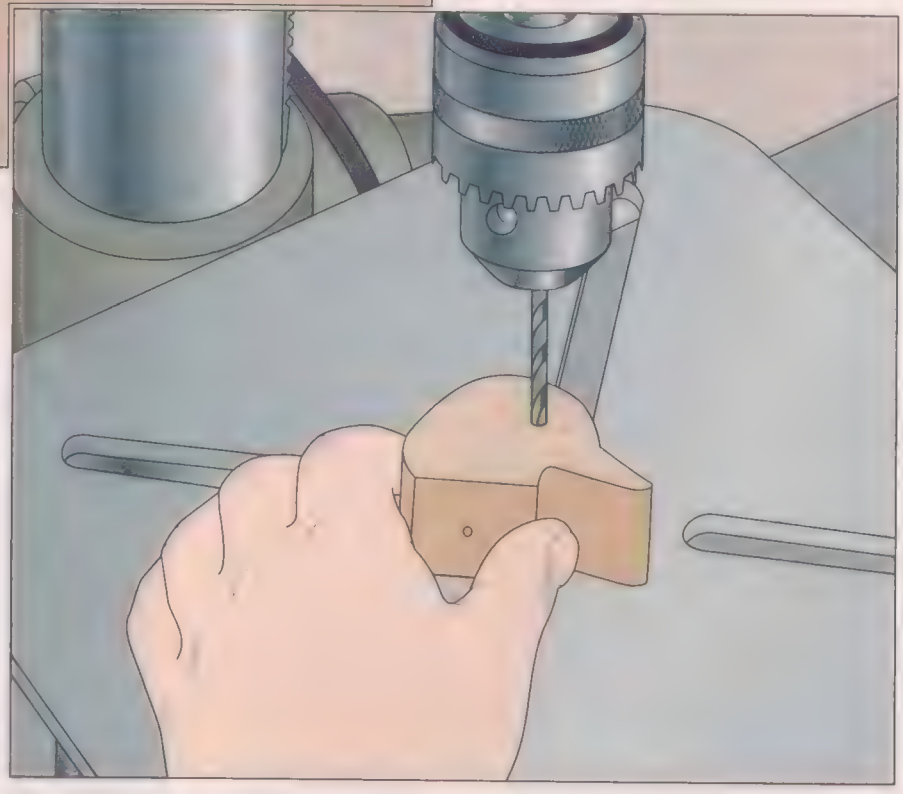



SIDE-VIEW TEMPLATE
Forehead
Crown
Eye
Ear
Nostril
Cape
Mane
Rump
Neck
Chest
Throat
Lower Mandible
Upper mandible
Breast
Belly
Side pocket
Tail
TOP-VIEW TEMPLATE
Side pocket
Back
Tail
Nail
Cover feathers
Side pocket
Secondary feathers
Primary feathers

PREPARING THE CARVING BLANK

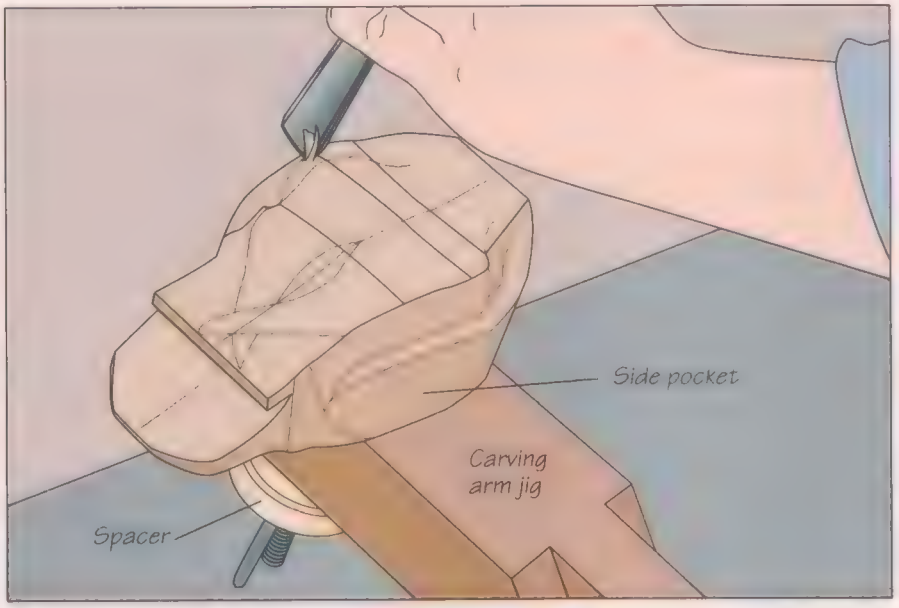


1 Laying out the design with templates
Make a blank for the duck's body from two pieces of wood—basswood is a good choice—2 inches thick and at least 10 inches square. Glue up another blank 3 inches square and 2 inches thick for the head. While the adhesive is curing, use the diagrams on page 97 to make top- and side-view templates. (Photocopying the patterns onto acetate works well.) Cut out the templates, and transfer the side view onto the carving block. Band saw the profile, then transfer the top template profile *(left)*, and band saw this shape. Now cut the head to shape. Use a gimlet to make a hole in the bottom of each workpiece to accept a carver's screw *(page 110)*.

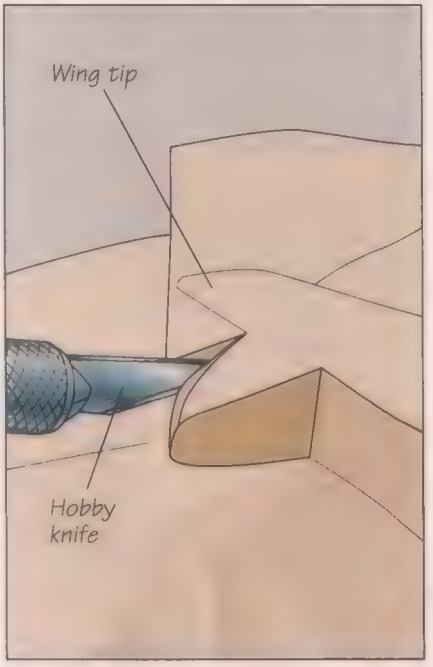


2 Drilling the eye socket
To ensure that the eyes of the duck will be symmetrical, drill a 3/16-inch hole right through the head *(right)*, using the point taken from the head template as a guide.

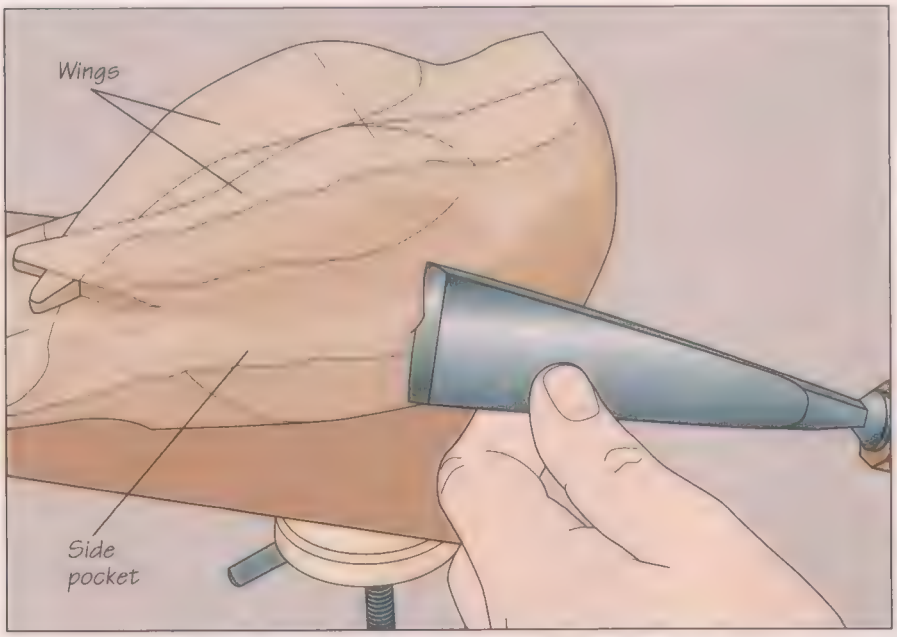
SHAPING THE BODY AND WINGS



1 Roughing out the wings and side pocket
Begin by marking out the side pocket on each side by tracing it from the top and side templates. Mount the blank onto a carving arm jig with a carver's screw *(see page 36)*, using nylon discs as spacers so the nut on the screw can be tightened firmly in place. Carve along the top line of the contour, which follows the wings, with a 12-millimeter No. 39 V-tool. Holding the gouge horizontally, carve along the line on the side of the blank corresponding to the top of the side pocket. Remove the waste, leaving a right-angled furrow, running along the curve of the wings and side pocket. Finish cleaning out the waste with the same V-tool *(above)*.

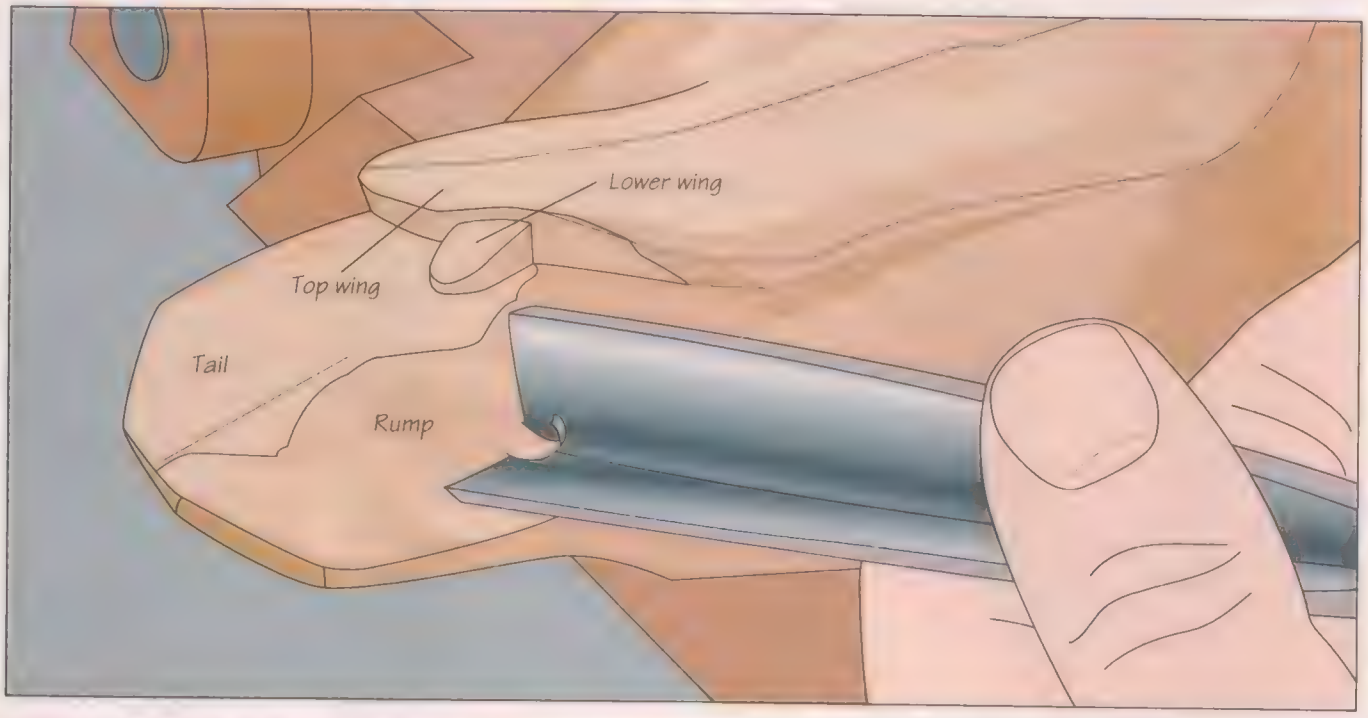


2 Carving out the wing tips
Carefully remove the waste from one side of the wing tips with a large V-tool. Use a hobby knife with a surgical blade to gently remove the waste from between the wing tips *(above)*. Then carve away the waste from the second wing tip.



3 Rounding the side pocket
With the back of the duck's anatomy roughly carved out, you must refine its form by rounding the edges. Use a 35-millimeter No. 3 gouge to round the convex shapes *(left)*, and a deep gouge, such as a 12-millimeter No. 11 gouge to smooth the concave edges, such as where the wings and side pockets meet.

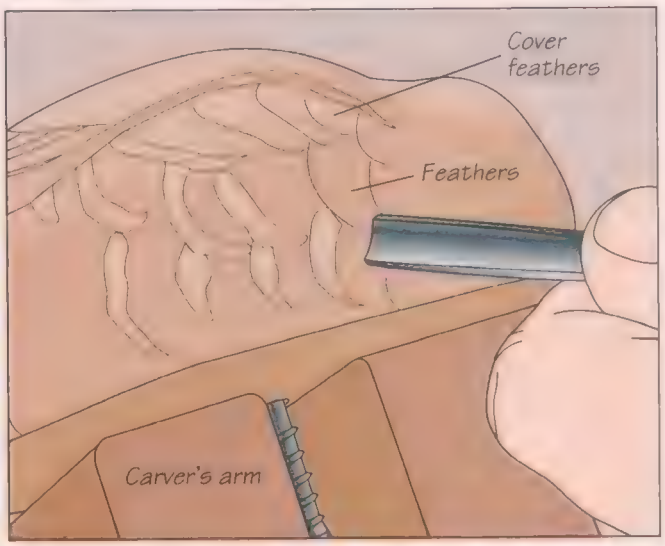
REFINING THE WINGS AND FORMING THE TAIL



4 Defining the top wing and tail section One wing tip should be carved so it appears to rest on top of the other one. With a 12-millimeter No. 39 V-tool carve along the profile of this top—or dominant—wing to a depth of about ¼ inch, as indicated by the side template. Round the bottom wing so it gradually slopes down to meet the bottom of the tip of the dominant wing. To carve the furrow that marks where the rump ends and the tail begins, retrace the appropriate line from the templates. Use a 12-millimeter No. 39 V-tool to pare away the waste *(above)*, as indicated by the templates. Then round and smooth the surface of the tail with a 12-millimeter No. 3 gouge.

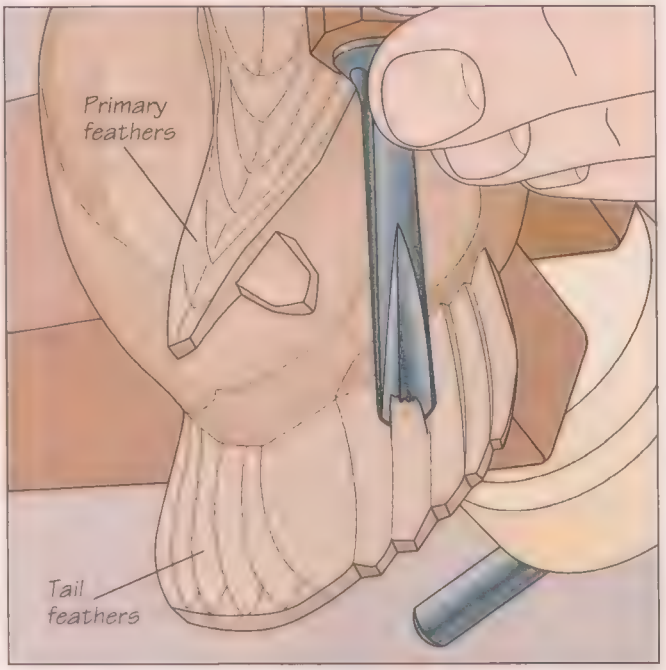
5 Carving the bottom surface of the tail Unscrew the blank from the clamp and remount the workpiece upside down. Sketch in a guideline to indicate the bottom surface of the tail, which angles out from the rump. Use a 12-millimeter No. 11 gouge to carve out the waste *(right)*.

CARVING THE FEATHERS



1 Carving the feathers on the side pocket and back

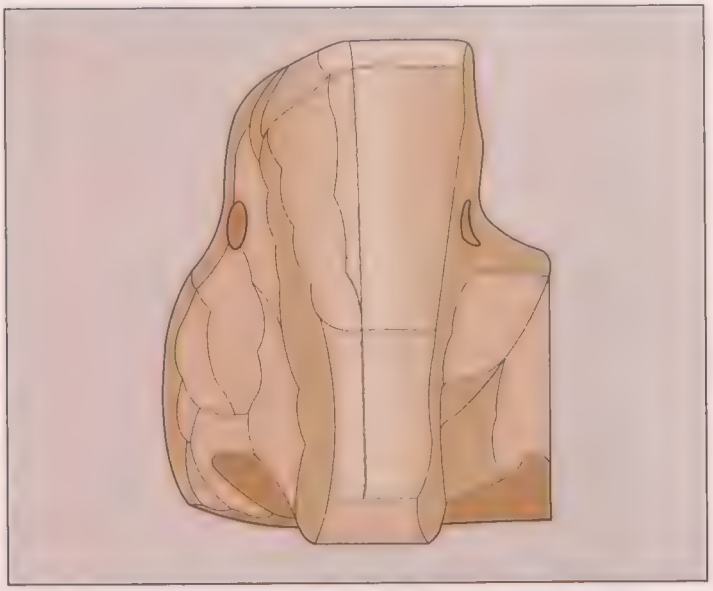
Begin by laying out the feathers on the side pocket and the back, including the cover feathers, as indicated on the template. This will give you a series of curves, indicating the tips of the feathers. Use a deep, narrow gouge, such as a 6-millimeter No. 11 to carve a groove along each line *(above)*. Then, starting with the feathers closest to the rump, use a 12-millimeter No. 3 gouge to angle the feathers so they are scalloped, giving the appearance that the feathers in front are lying on top of the ones just to the rear.



2 Adding primary feathers and tail feathers

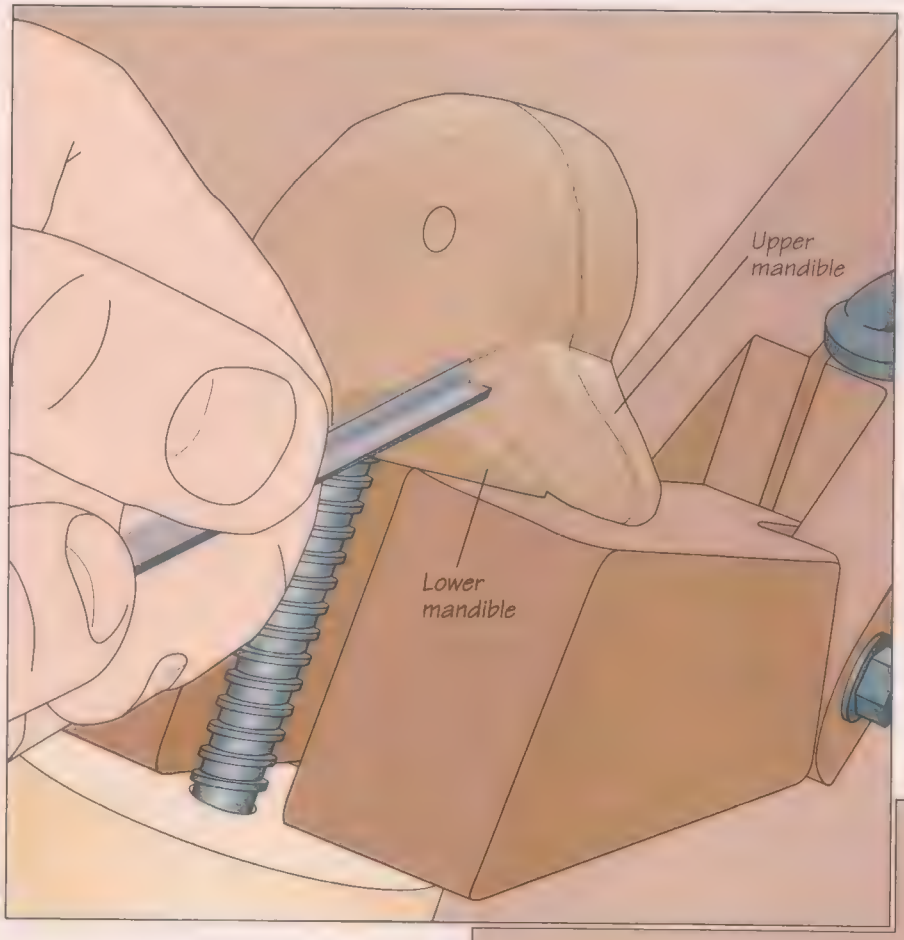
Use the top template to lay out the feathers on the top of the wing tips—the primary feathers—and the feathers on the tail. Cut these feathers out with a 6-millimeter No. 39 V-tool. The feathers nearest the center line are the highest, and create a layered effect toward the edge.

CARVING THE HEAD



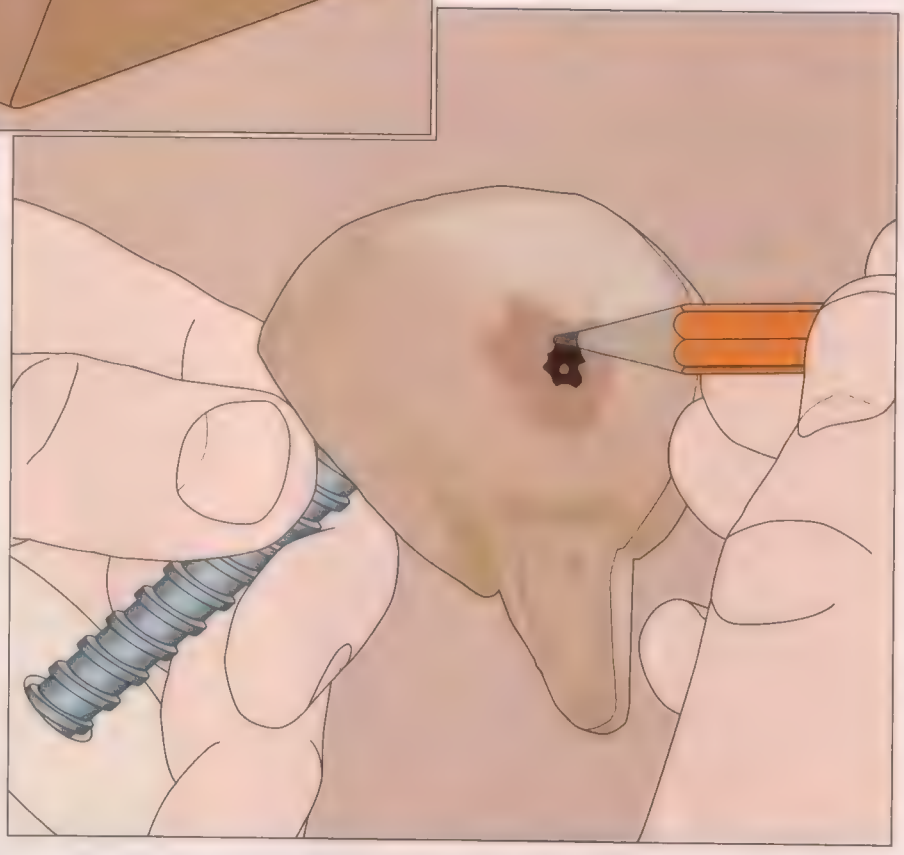
1 Carving the head

Secure the head blank to the carving arm jig *(see page 36)*. Use the side- and top-view head templates *(page 99)* to sketch in the head details. The cheeks bulge out at about the same height that the top of the beak begins. Pare away the waste from the upper part of the head with a 12-millimeter No. 3 gouge. Clean out the indentation above the cheek with a 12-millimeter No. 11 gouge, leaving this area clearly defined, as on the right side of the illustration at left. Sketch in the details of the head again, then refine the contours with a 6-millimeter No. 3 gouge, softening the curves, as on the left side of the illustration.



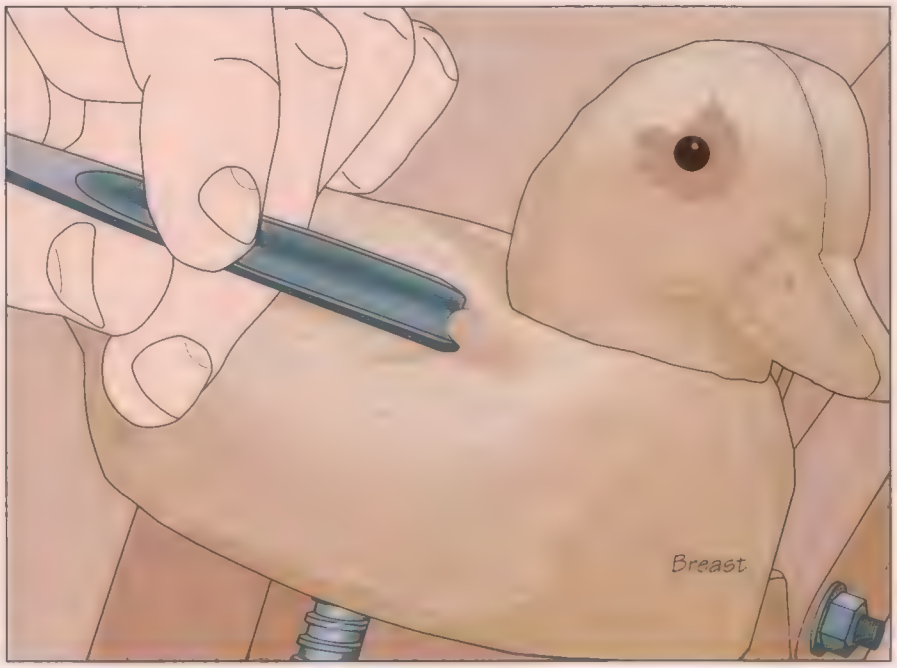
2 Carving the beak

Refer to the illustrations on page 98 for the correct design of the duck's beak. Use a 6-millimeter No. 39 V-tool to refine the shape of the beak. Use the same gouge to carve the lower mandible. Note the way it narrows and is shorter than the upper mandible, creating an overbite effect. Carve the line where the beak meets the forehead and chin so the head is rounded over into the beak *(left)*. Then carve the bottom of the beak, referring again to the illustrations on page 98.



3 Adding the eyes

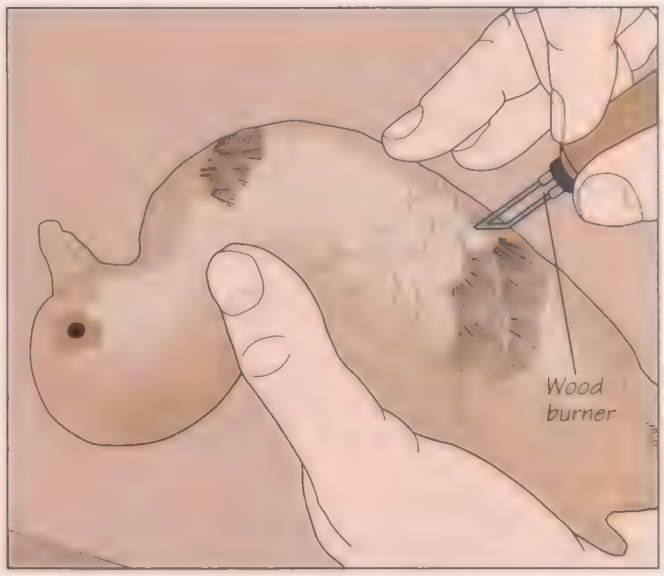
Drill a hole slightly larger than the eyes you have selected *(see photo, opposite)* into the eye hole you bored earlier. The eyes are held in place by acetone-based wood filler. (It is important to use acetone-based wood filler, as water-based filler will not wood burn properly.) Press the eye into place with a pencil eraser, then use the tip of the pencil to clear the excess putty away from the center of the eye *(right)*. If the hole is too deep, add more filler. Do the same for the other eye, then look at the front of the head to make sure the eyes look even. Once the wood filler has dried, sand it smooth with the head, taking care not to scratch the eyes.



4 Attaching the head

Make a small hole in the base of the head with a gimlet. Drill a hole through the neck perpendicular to the flat area where the head meets the neck on the body. Test fit the head onto the body by screwing it on. Some carvers prefer a head that is turned slightly. Once you have chosen the position of the head, grasp a 12-millimeter No. 11 gouge like a pencil. Remove excess material from the breast, until it meets the neck. Carve the body and neck so the head merges smoothly into the curves of the body *(left)*. If the joint between the body and head is not seamless, make a mark indicating the position of the head and remove the head from the body. Then use a flat chisel to smooth the surfaces where the head joins the body until the joint is perfect and glue the piece in place.

FINISHING

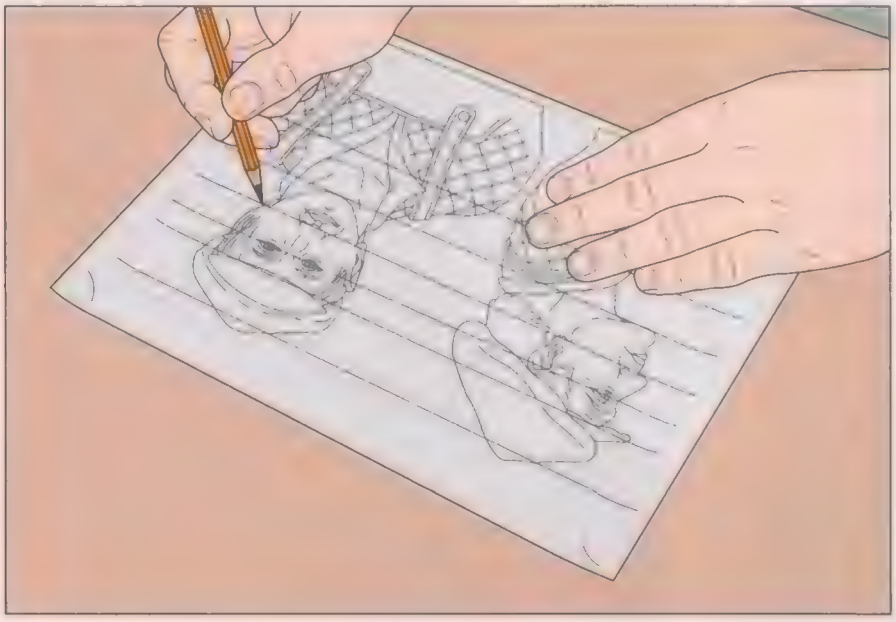


Adding texture with woodburning

Fit a fine tip on your wood burner, and etch fine lines to indicate the tips of feathers *(above)*. Note how the hand is supported by the middle finger. Where the shape of larger feathers has been carved, the woodburning pattern should cover each tip as a single feather. Where feathers have not been carved, use the same pattern, but smaller, to create the appearance of overlapping feathers, with only the tips exposed under those above.

There are two types of eyes that you can use with your decoy: flint and colored. Both are available at hobby stores. The flint eyes require two coats of acrylic paint on the back of the eyes to simulate the actual color; colored eyes are simply set in place. Once the eyes are in position, the feathers can be added with a wood burner, creating a natural, lifelike appearance.

PREPARING TEMPLATES

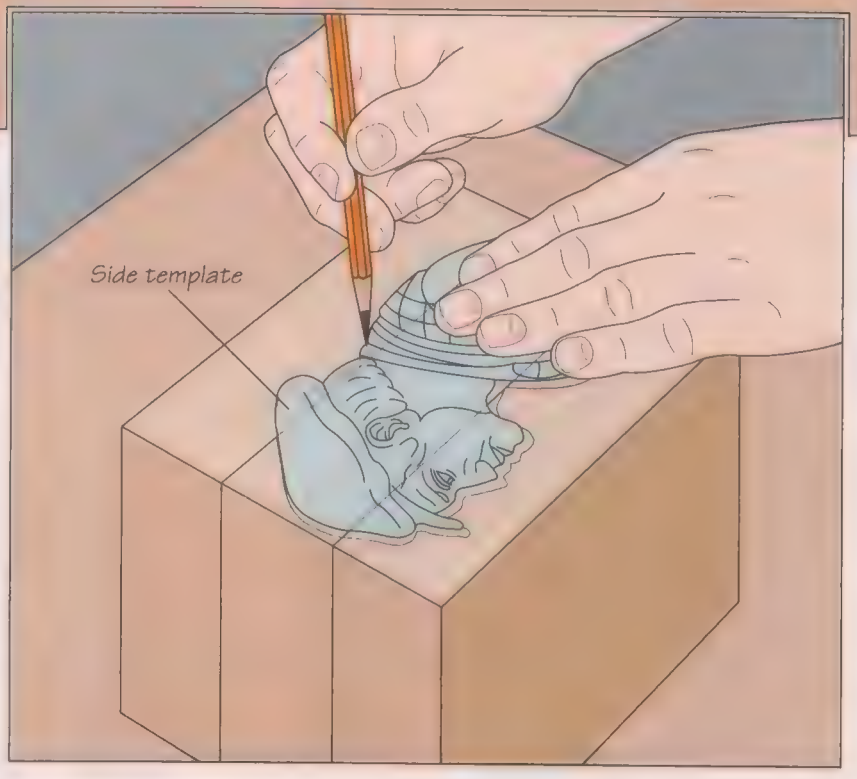


Sketching a face

Decide how large you want your finished bust to be, and lay out guidelines reflecting the proportions of the human face, as shown on the opposite page. These lines will help you create accurate drawings of your subject, by sketching the face and profile over them *(left)*. You will need both a front and a side view. Transfer the drawings by photocopying your sketch onto acetate. If you wish to reproduce the bust of the old carpenter being carved in this section, simply using the templates shown above and transfer them to acetate.

PREPARING THE BLANK

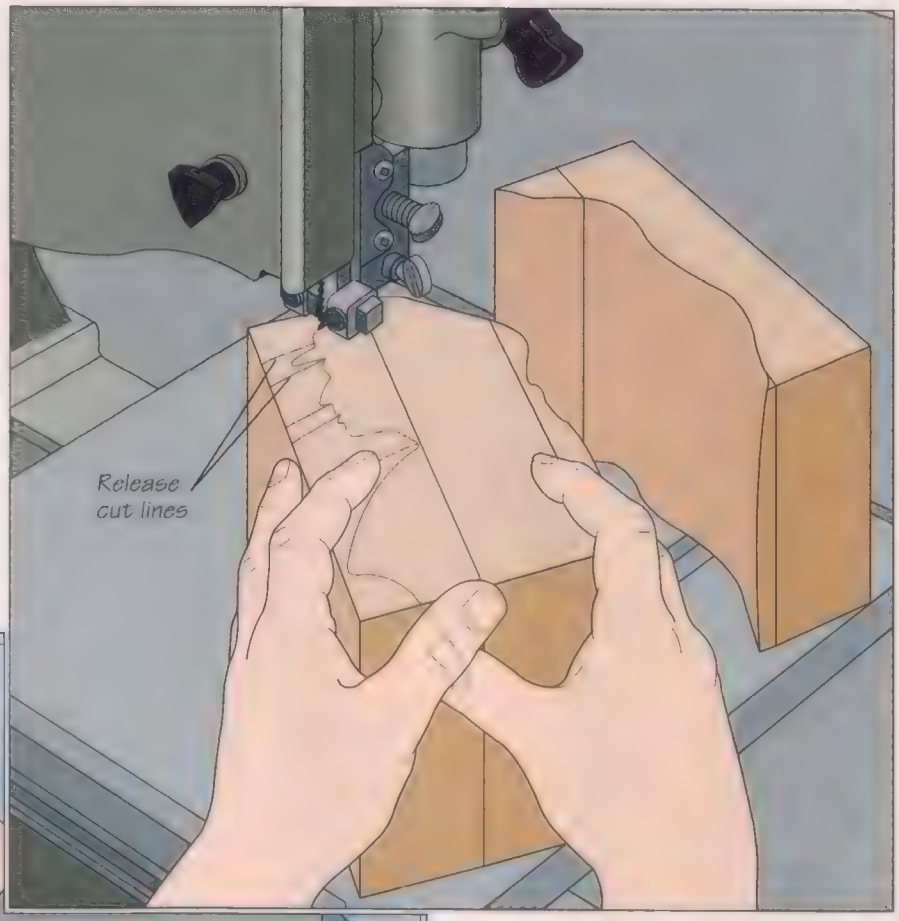
1 Gluing up the blank
Glue up a blank from pieces of wood roughly an inch and a half thick. Apply adhesive to each of the pieces and clamp them together *(above)* until the glue cures.



2 Tracing the profile
It is easiest to band saw the side view first, because this will leave a reasonably flat surface on the back of the workpiece for cutting out the front outline. Lay the template of the profile on the side of the carving blank and trace the pattern *(right)*.

3 Cutting out the profile

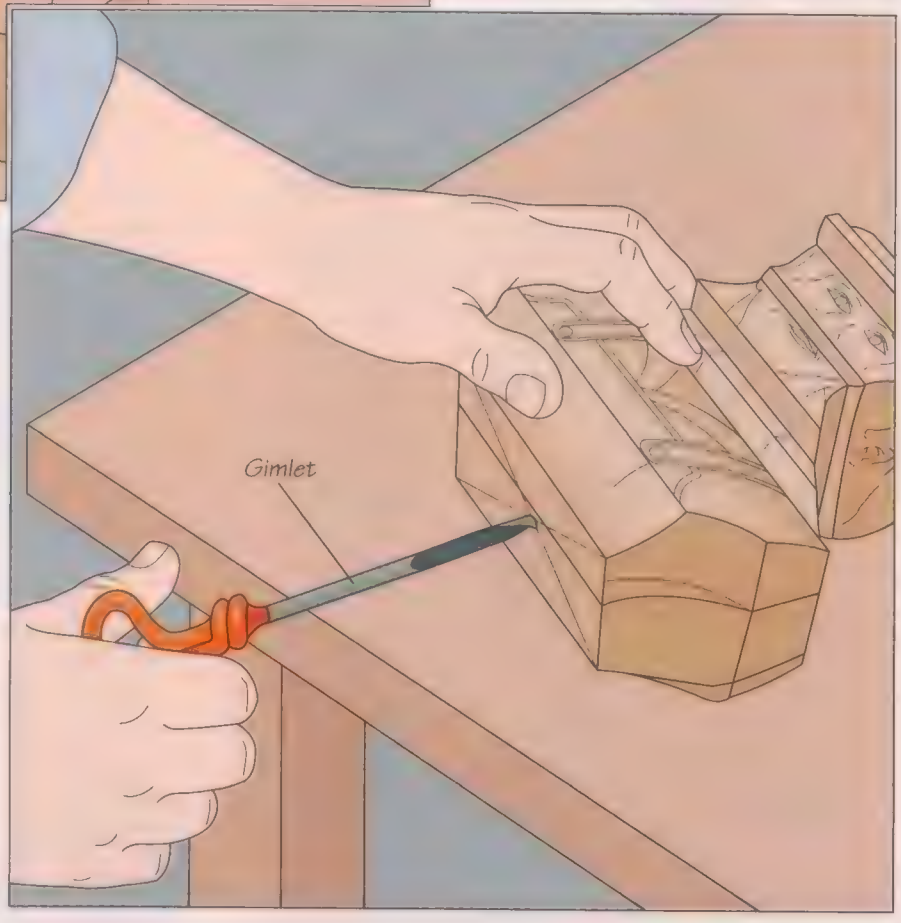
Cut out the profile using a band saw. You should be able to cut the back part in one pass because the curves are not too tight, but the front will require some release cuts from the edge of the workpiece to the cutting line. This will enable the saw to cut along a tighter turn by facilitating the removal of waste wood. The exact location of these cuts is arbitrary, but try to make them to the sharpest parts of the curves, as shown at right.



4 Tracing the front view

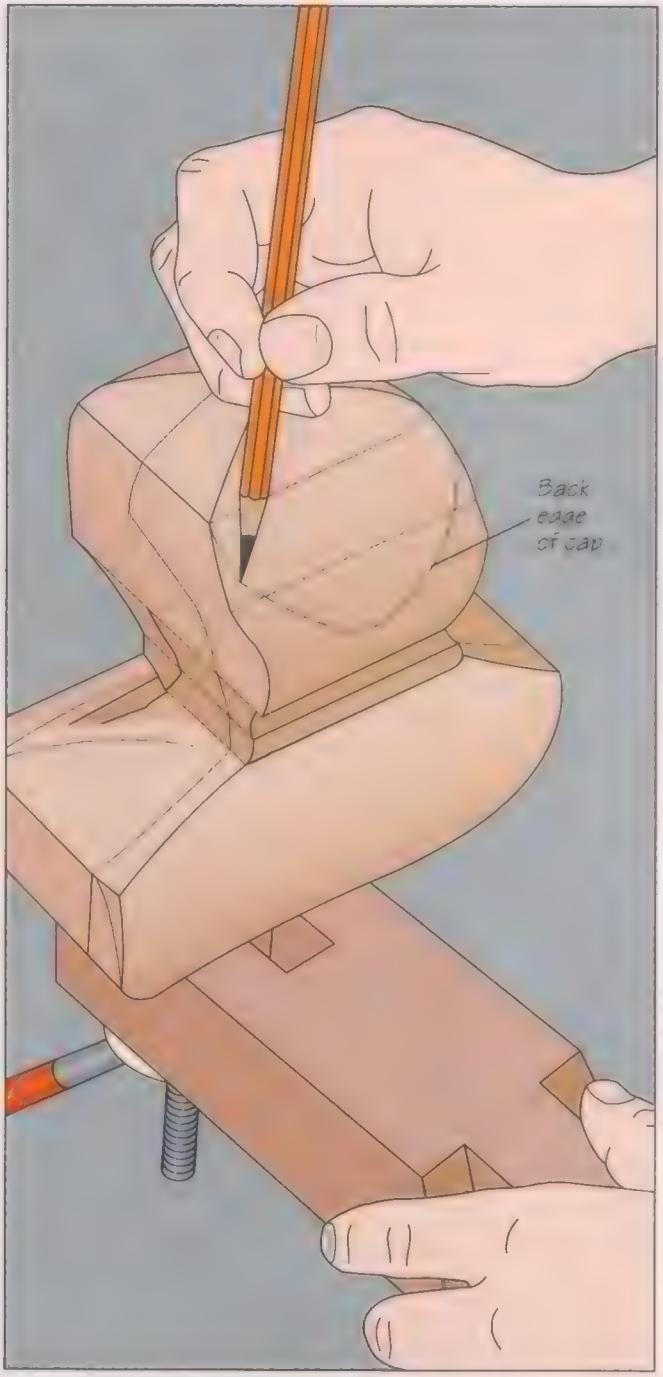
Once you have cut the profile, trace the outline of the front view. Make certain that the eyes and other features on the front template are aligned with the side view. Most importantly, make sure the front template lies flat across the face of the blank as you trace its pattern *(left)*. Do not bend the template to conform to the ridges and valleys of the profile, or you will distort the image.

5 Retracing features on the blank
Once the face and profile of the bust have been band sawed roughly to shape, you will need to resketch the features that have been eliminated by the cuts. Hold the appropriate acetate template level on the blank and retrace the outline and various details, by looking through the acetate while you sketch the lines in beneath it *(left)*.



6 Adding the hole for the carver's screw
Locate the hole for a carver's screw by drawing two diagonal lines from corner to corner across the bottom of the carving blank. Make the hole for the carver's screw with a gimlet *(right)*. Unlike a standard drill bit, a gimlet has a tapered shaft, which will allow the carver's screw to fasten more securely in the blank without the risk of cracking the wood. As your work progresses, the original hole may loosen. In this case, make additional holes as necessary near the center of the bottom of the workpiece.

ROUGHING IN THE FORM



1 Adding a top profile
Sketch in lines indicating the rounded edges of the head and shoulders when viewed from overhead *(above)*. Compare these lines with the template. Make sure that the line marking the circumference of the hat, for example, is as wide as indicated by the front template.

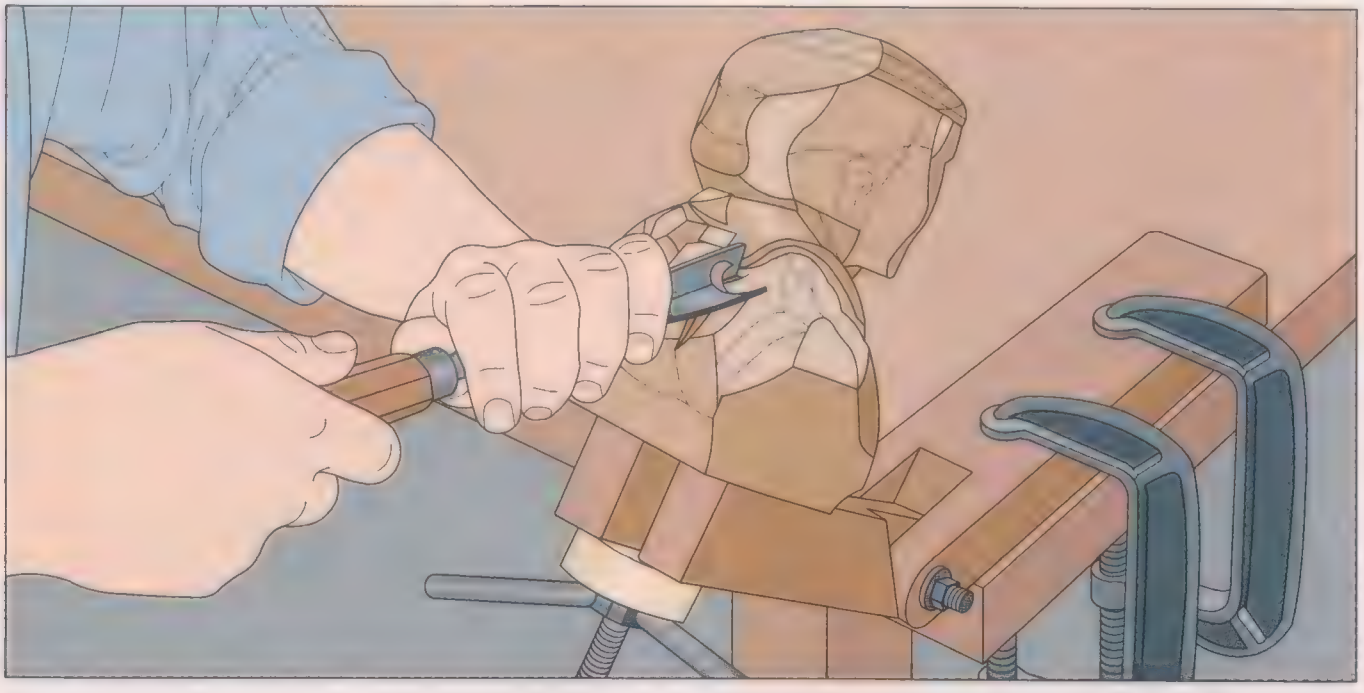
The roughly shaped form of the old carpenter has been fastened in place with the carver's screw. The features have been sketched in again, as they will be repeatedly throughout the project. The next step is to begin paring away the waste from the form, creating broad details.

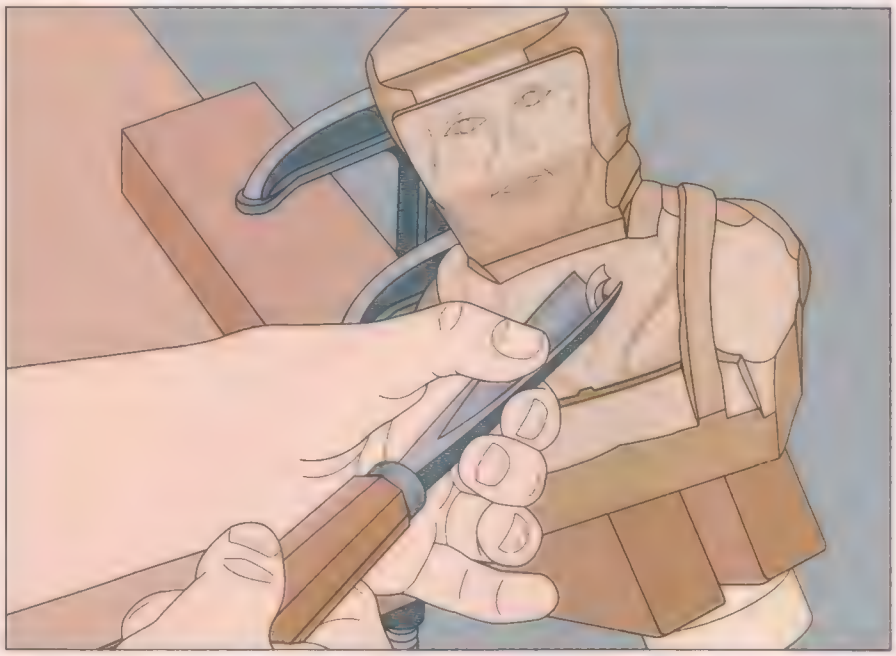
2 Rounding the corners of the head and shoulders

Chisel away the waste you defined in the previous step. Use a 35-millimeter No. 3 gouge, striking the handle of the chisel with the palm of your hand *(right)*.

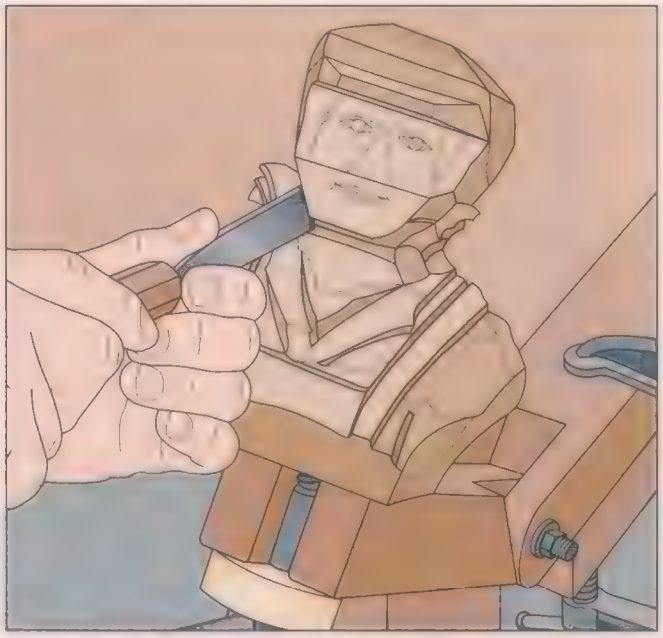
3 Chiseling in the back and suspenders

Chisel the shallow depression on both sides of each suspender with a 25-millimeter No. 39 gouge *(below)*. Sketch in the front suspenders, then continue the lines back by eye. Usually, carvers do not use a template for each side, as this can introduce errors if the templates are not perfectly matched.

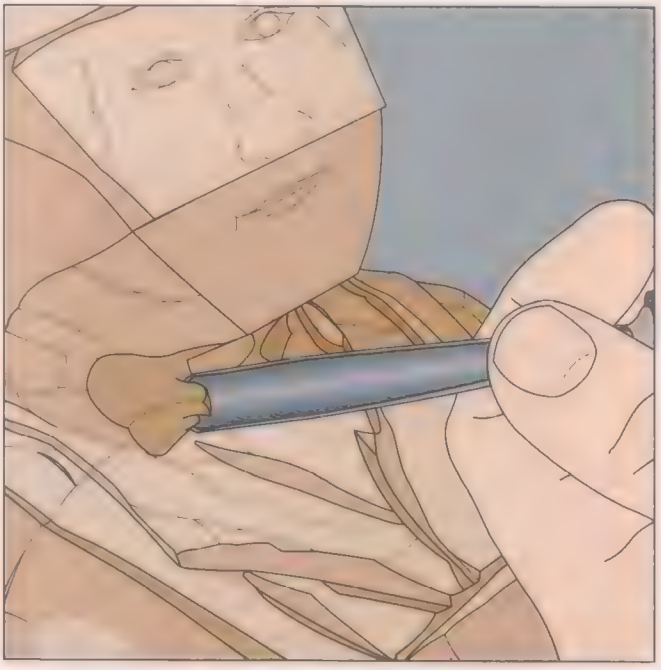




4 Roughing in the collar
Compare the front of your carving with the front template. Resketch the design as necessary. Delineate the edges of the collar with a V-tool, then remove the waste with a 12-millimeter No. 11 gouge *(left)*. Note that the space between the collars is slightly deeper than the areas to either side of the collars, where they lie on top of the shirt.

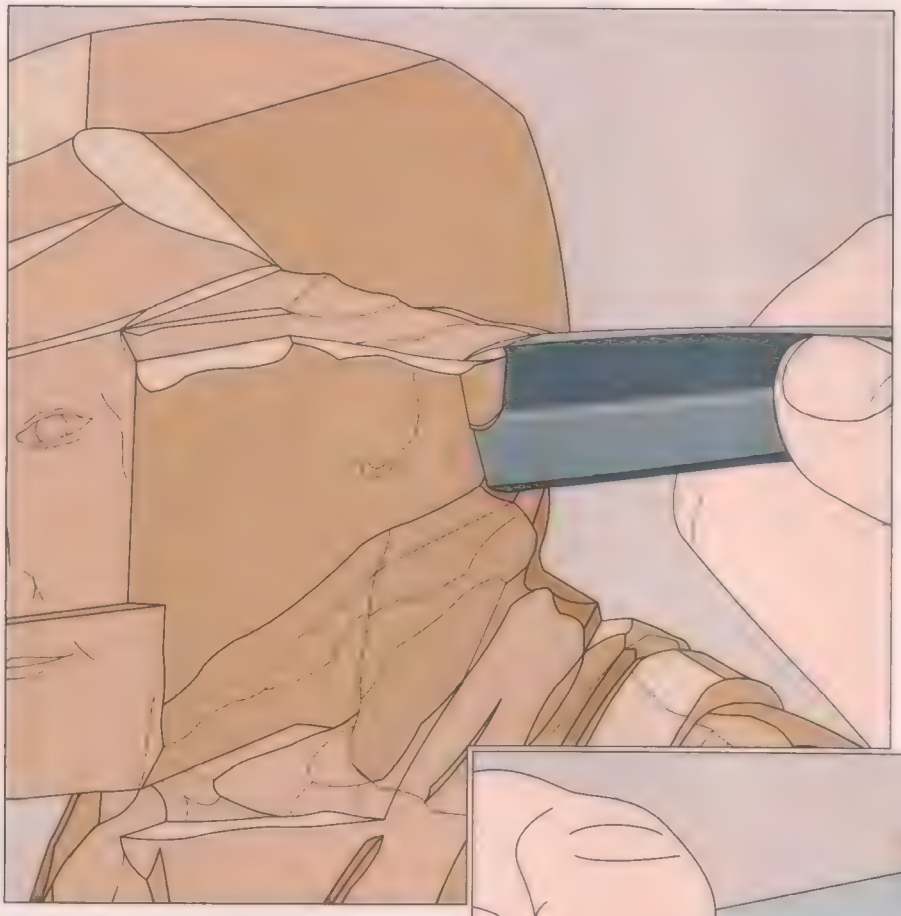


5 Creating the outline of the face
To begin defining the face, check the sketch of the face against the front template. The lines indicating the cheeks form a V, with its point at the tip of the chin. Pare away the waste with a 12-millimeter No. 3 gouge *(above)*. The waste should be removed to the cheek lines at the front. The depth of waste pared away should decrease until it stops just at the joint where the ears will begin. If necessary, sketch in the profiles of either side of the head using the side template.

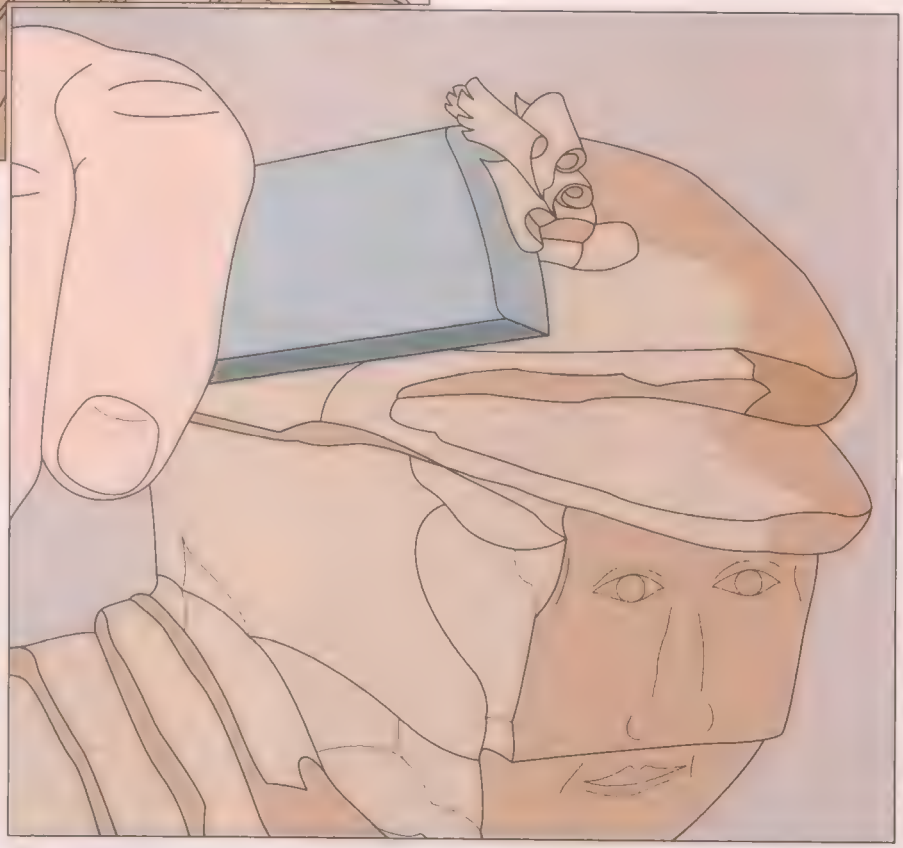


6 Rounding the neck
The pronounced roundness of the neck is best carved with a 12-millimeter No. 11 gouge. Sketch in the lines that you carved away in the previous step on both the front and sides. Carve away the waste *(above)*, bearing in mind that the neck is longer directly beneath the chin and shortens over the shoulders. Be sure to leave enough waste so you can define the jaw without making the neck too thin.

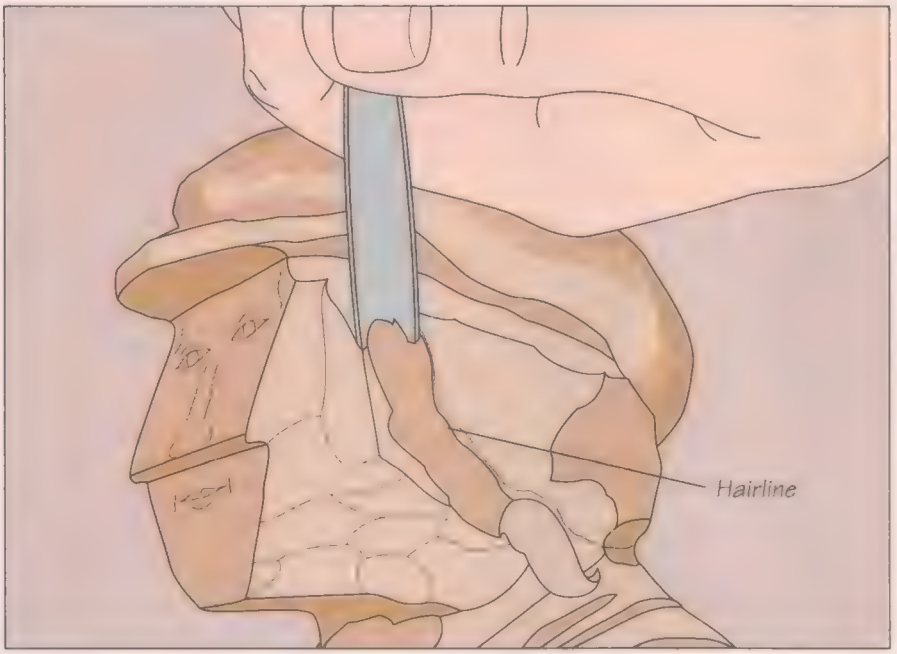
CARVING THE GENERAL FORMS OF THE HEAD AND CAP



1 Roughing in the cap
Sketch the outline of the ears, hair, and cap. With a 12-millimeter No. 39 V-tool, carve along the line where the cap meets the hair *(left)*. The lower surface, where the hair is located, should have a gentle curve downwards, while the point where the cap meets the head should be parallel to the ground.



2 Rounding the cap
Use a 35-millimeter No. 3 gouge to round the top of the cap. The normal way to remove waste is with the bevel facing down, resting on the work. However, you can also work with the gouge inverted, as shown at right. This method creates a smoother curve but it requires some care, since the gouge will have a tendency to nosedive into the wood as it follows the grain. Make certain the cutting edge is very sharp. Practice the technique on scrap wood until you feel comfortable with it.

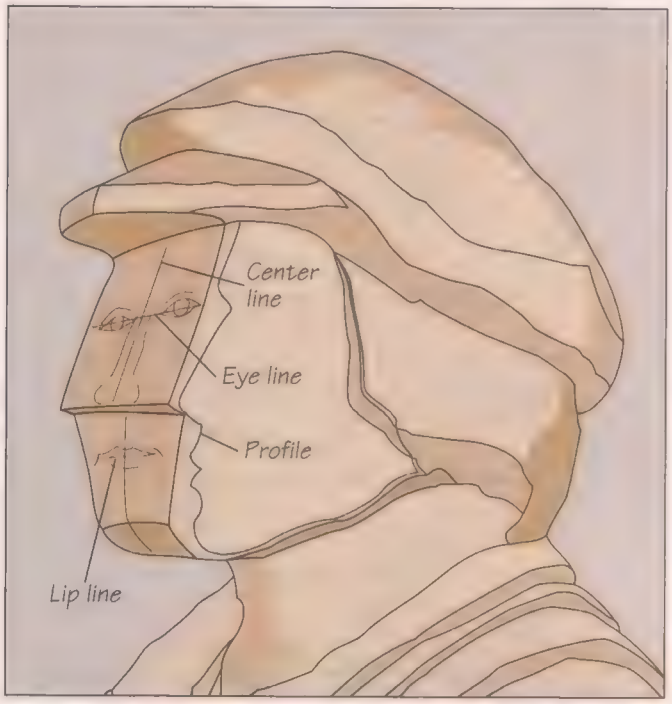


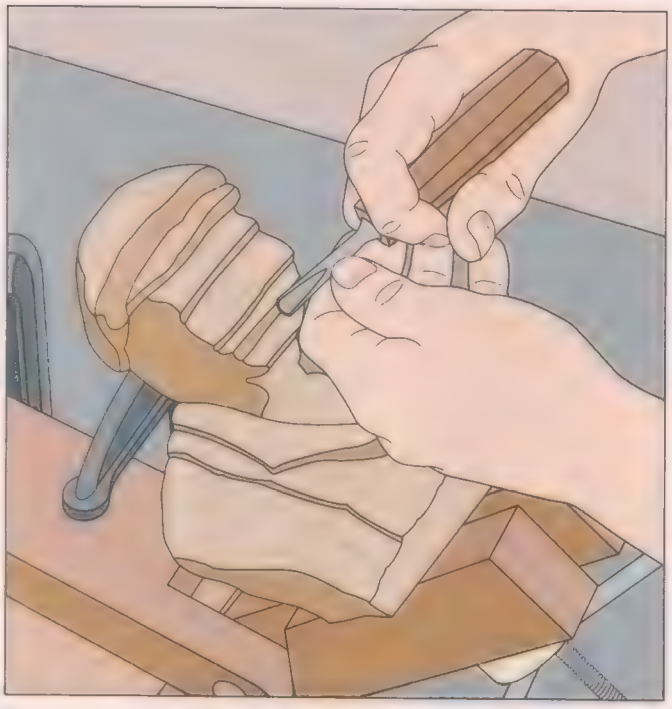
3 Adding the hairline
Use the side template to draw the hairline, and use a 6-millimeter No. 11 gouge to remove the waste along the line *(left)*. This material should be pared down to a depth of about ⅜ inch. You can check this by comparing the carving to the front template.

4 Defining the cheeks
Check the outline of the cheeks, neck, and hairline against the front and side templates. With a 6-millimeter No. 3 chisel, form the rounded curves of the cheeks, stopping at the hairline *(above)*.

5 Checking the size and symmetry of the features
Use a pair of dividers to check the size and symmetry of the features. As the various parts of the face become more defined, you must be more precise in ensuring that they conform to the original pattern. Adjust the dividers against the template, then check the measurement against the carving *(above)*. If a discrepancy appears, go back and repeat the step, recarving as necessary.

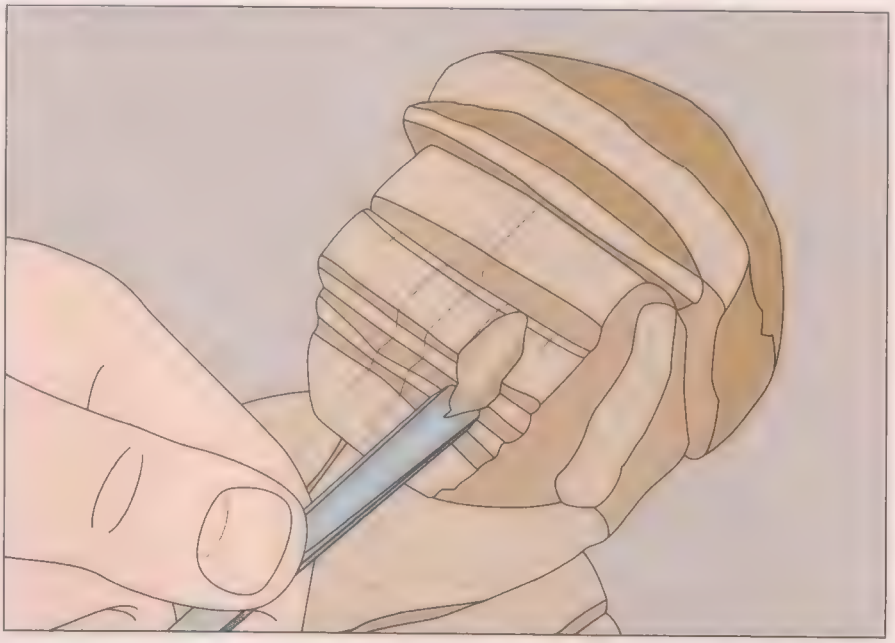
REFINING THE FACE





1 Roughing in the eyes, lips, and chin

Sketch in the features of the face from the front template. Note the center line running down the middle of the face, which is perpendicular to the eye line and lip line *(above, left)*. The guide lines will help ensure that the features are positioned correctly. Sketch in the profile from the side template. Use a 6-millimeter No. 11 gouge to chisel out the furrows for the eyes, above the lips, and between the bottom lip and the chin to the depth indicated by the profile on the side of the blank. Use a 6-millimeter No. 39 gouge between the lips. Grasp the chisel as shown in the illustration *(above, right)*, while guiding the tip with your other hand.



2 Forming the cheeks

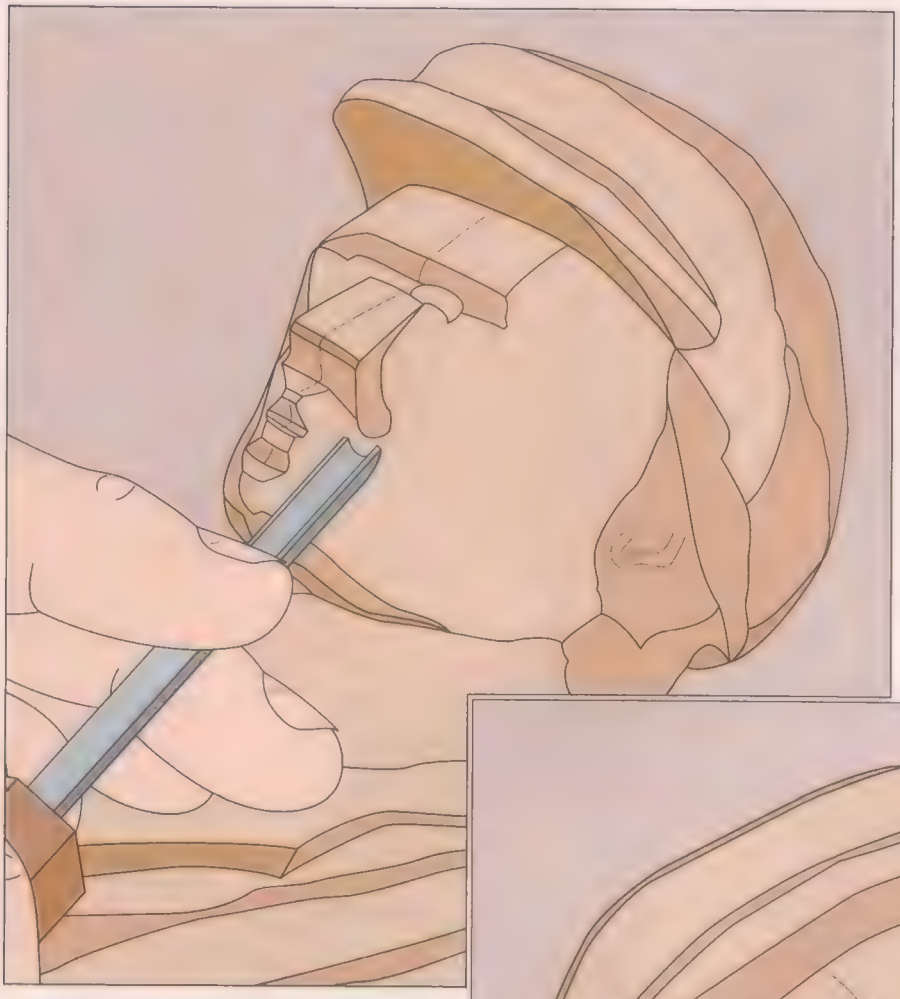
If you hold the palms of your hands against your cheeks, you can feel how their planes meet at almost a 90-degree angle. To carve this shape, mark the center line again and add guide lines to define the edges of the eyes. These lines will also define the width of the nose, since the edges of the nostrils lie directly beneath the inside corners of the eyes *(see page 106)*. Use a 12-millimeter No. 11 gouge to pare away the waste and form the cheeks *(right)*. The depth to which you cut is indicated by the profile on the side of the blank. Be careful to leave enough waste to carve the cheek bones.

ROUGHING IN THE FACIAL DETAILS

1 Smoothing the facial planes

The most rugged face contains curves where the features meet. Pare down the cheeks with a 12-millimeter No. 3 gouge *(right)*. Repeat the process to round the angles slightly and to achieve a finer, smoother overall texture. Note how the forehead curves gently in front before angling back sharply just in front of the temples. The cheeks slant inward slightly from the cheek bones. Refer to the templates, resketching lines as necessary. Check the carving frequently from all angles, including the top and bottom, to ensure that the features are symmetrical.

Although the finer details have yet to be carved, the general features of the face, including the forehead, nose, and cheeks, are already apparent in this photograph. Before working on the nose, eyes, and ears you need to continue smoothing the general facial features, as described in the step above.

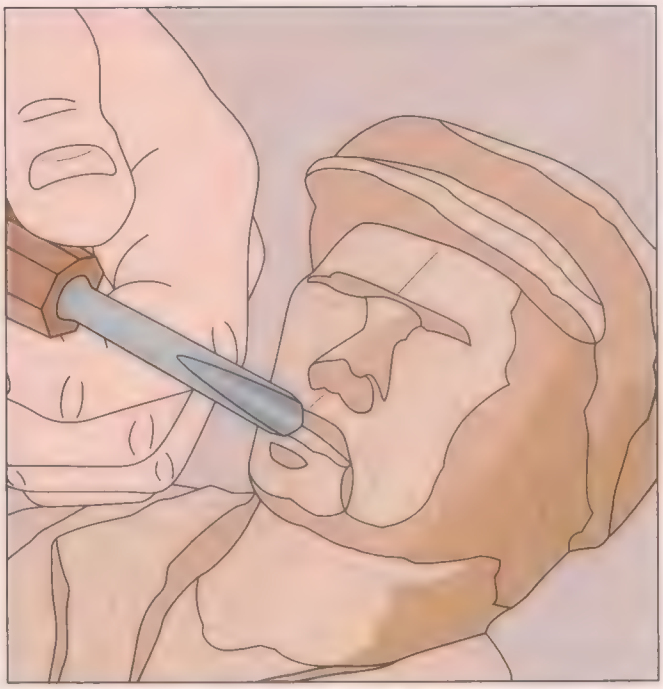


2 Adding the expression lines

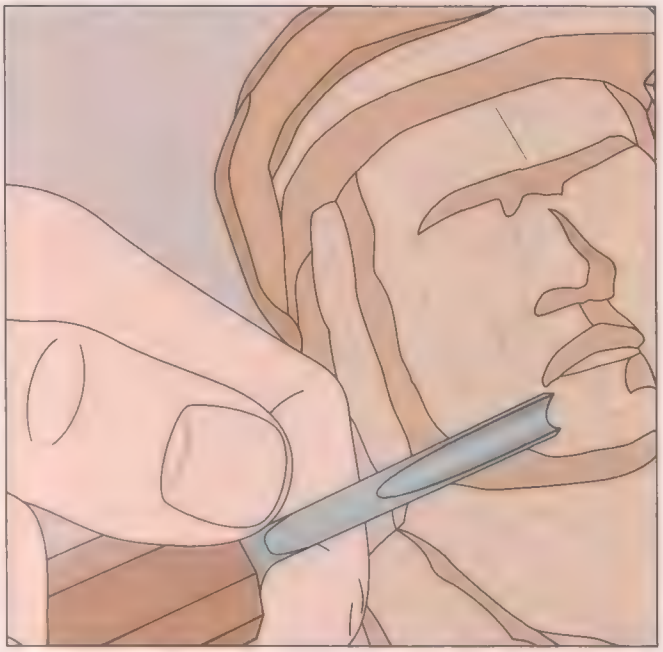
Expression lines are creases in the face that begin in the curve of the nostrils and angle downward towards the jaw line, affecting the shape of the cheeks. These lines do not touch the corners of the mouth when the face is at rest, as in the old carpenter's face. Sketch in these lines, then carve them with a 4-millimeter No. 11 gouge *(left)*. These lines become more pronounced as they approach the nose. Clean up the lines with a 4-millimeter No. 3 gouge.

3 Carving the nostrils

Compare the carving with the template by means of dividers as frequently as necessary. Start by chiseling away the waste on either side of the bridge of the nose with a 12-millimeter No. 11 gouge. You should stop as you reach the nostrils and round them over. Undercut the nostrils with a 4-millimeter No. 3 gouge at the point where the expression lines meet the nostrils *(right)*.

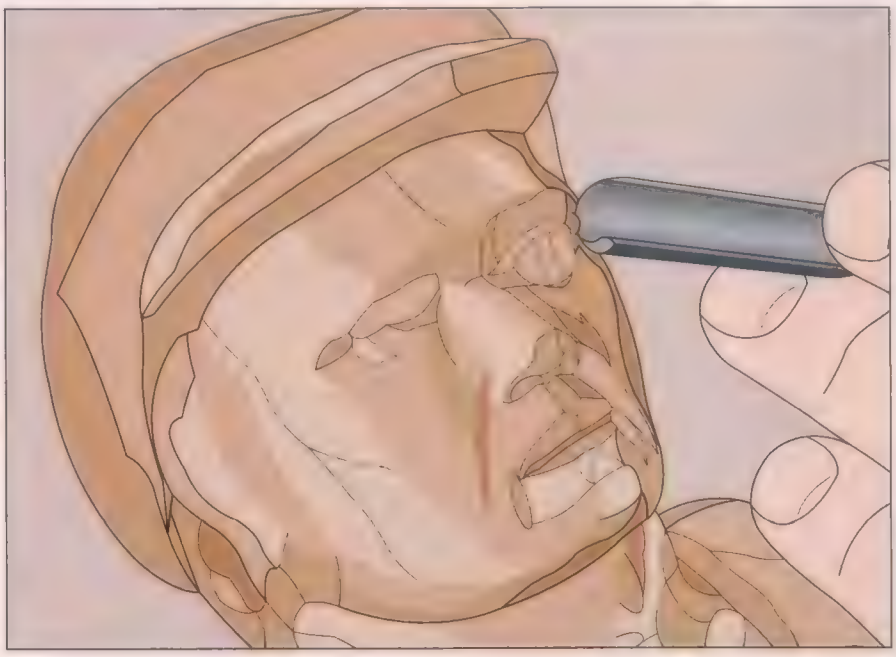


4 Carving the lips
The detail of the meeting of the lips and the creases at the corners of the mouth are made with a V-tool. Use a 6-millimeter No. 39 V-tool to part the lips *(above)* and gradually taper the creases toward the edges of the mouth.

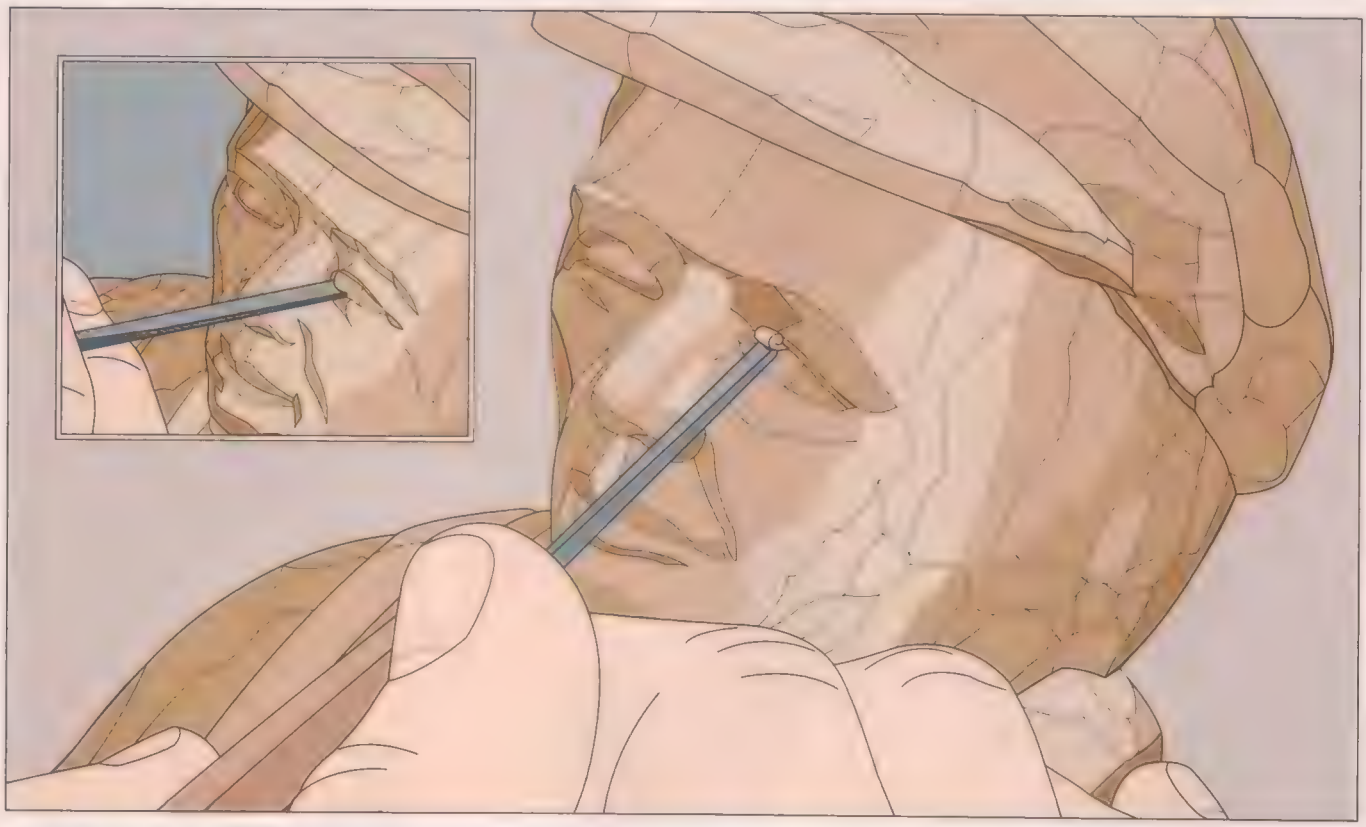


5 Carving the chin
Refer to the side template to help you round over to the correct profile. Use a 6-millimeter No. 11 gouge to round the chin and the space between the lip *(above)*. Round the space between the upper lip and the nose, and add the small indentation above the upper lip, known as the septum.

CARVING THE EYES



1 Forming the upper eyelid
To make the eyes, perform steps 1 and 2 for one eye, then repeat for the other eye. Refer to the templates for the precise location of the eyelids and pupils. Use a 6-millimeter No. 11 gouge to round over the upper eye lid *(left)*. Next, with your 6-millimeter No. 39 V-tool, carve a furrow from one corner of the eye to the other. This will produce the edge of the upper eyelid where it meets the eyeball. Use a 4-millimeter No. 2 chisel to shave away the waste below the upper eyelid, creating the round form of the eyeball. Then round over the bridge of the nose and smooth the sides above the nostrils.

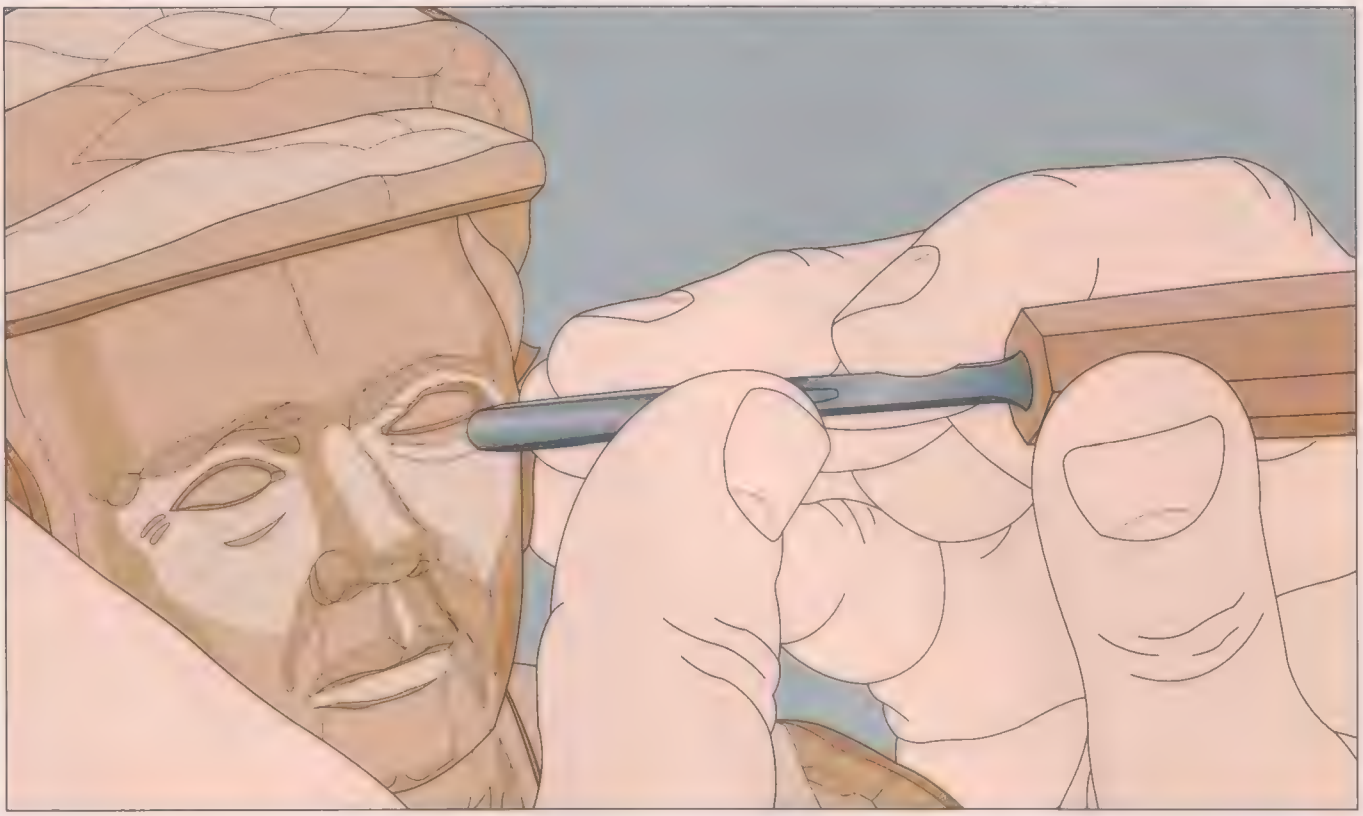


2 Defining the upper eyelid

Carefully pare away the waste with a 4-millimeter No. 3 gouge to create the ridge that marks the bottom edge of the upper eyelid *(above)*. Then refine and smooth the rounded shape of the eyeball with a 4-millimeter No. 1 chisel *(inset)*. Repeat step 1 and 2 for the other eye.

3 Forming the curve of the upper eye socket

As in steps 1 and 2, perform steps 3 through 5 in order for one eye, then repeat the steps for the other. Begin by creating a furrow just above the bottom of the top eyelid. Use a 4-millimeter No. 8 gouge to carve from one corner of the eye to the other *(right)*.



4 Forming the curve of the lower eye socket

Add a furrow to the lower eye lid as you did to the top, using the same gouge *(above)*. Grasp the tool like a pencil in your right hand, while using the thumb of your left hand to help guide the cut.

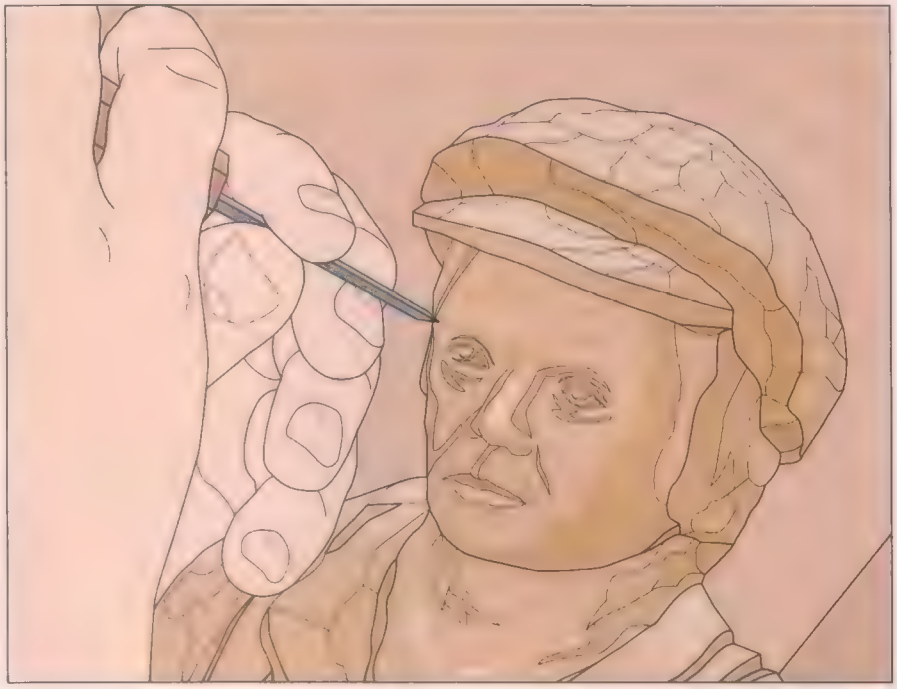
5 Final smoothing

Use a 6-millimeter No. 11 gouge to smooth the area below each lower eyelid. Carefully blend the curve at the bottom of the eye socket into the slight bulge of the cheek bone. Repeat steps 3 through 5 for the other eye, finishing off with the final smoothing *(left)*.

6 Positioning the pupils
Set the dividers with one pointer in the outside corner of one eye, and the other pointer in the inside corner of the second eye *(left)*. This is the distance that should separate the pupils so the eyes will appear to look in the same direction. Mark the position of the pupils. Although this trick may seem simple, it is easy to end up with assymetrical features if you skip doing it.

7 Adding the pupils
Now use a 4-millimeter No. 11 gouge to form the pupils. Pare away a small half circle to shape the bottom of the pupil *(right)*, then pry out the top half with the gouge inverted to finish the job.

8 Adding wrinkles
Add fine wrinkles at the corners of the eyes with a 4-millimeter No. 39 V-tool. Three or four lines is sufficient to create the impression of age in the eyes of the carpenter *(right)*.



CARVING THE EAR

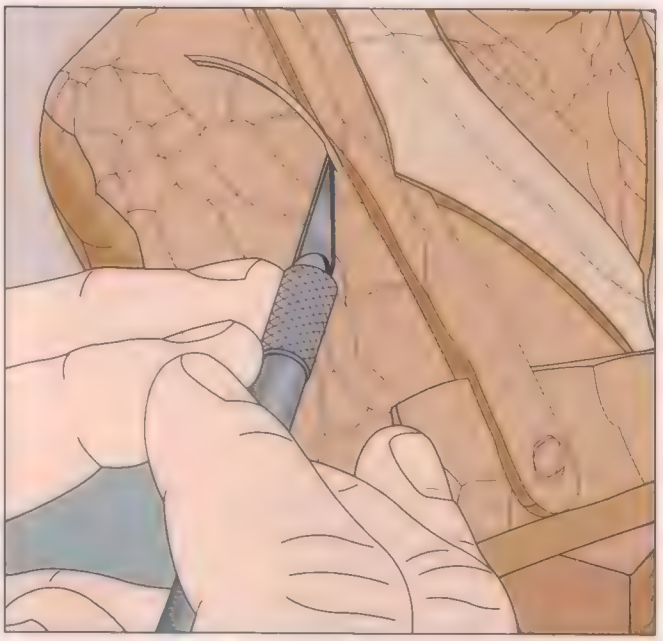
1 Roughing in the ear
Sketch in the outline of each ear. Chiseling from back to front, carve the ear so it tapers closer to the head near the front *(left)*.

2 Shaping the hairline around the ear
Use a 12-millimeter No. 3 gouge to cut around the shape of the earlobe. Gently press the edge of the gouge into the wood along the edge of the earlobe *(right)*. Next, carve away the waste, tapering the wood that will become the hair so it appears to curve beneath the bottom of the ear.

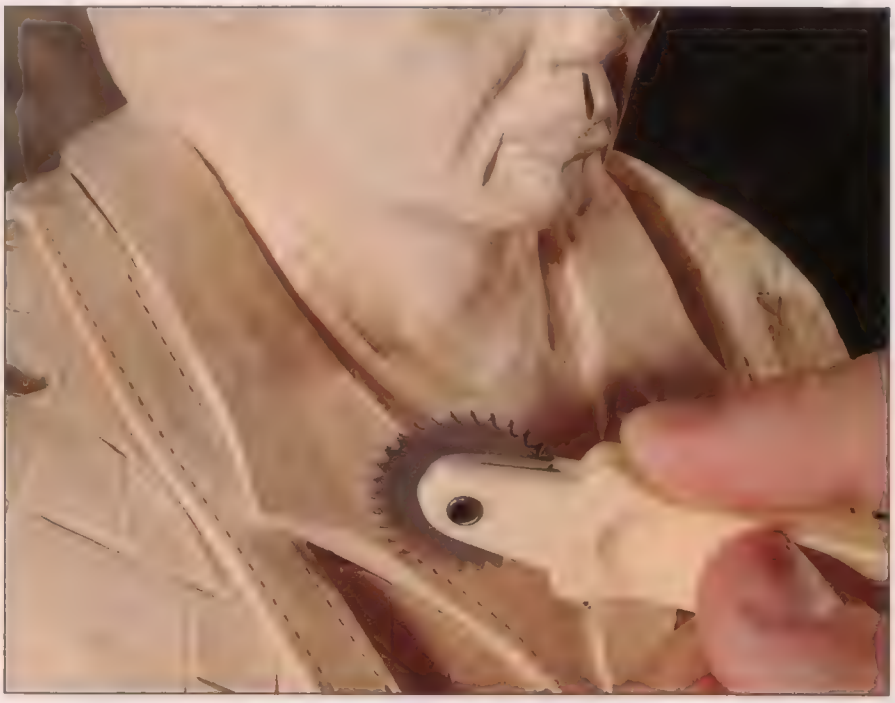
3 Carving the interior details of the ear
Use a 6-millimeter No. 11 gouge to carve the small ridges inside the ear lobes *(left)*. The ear lobe can vary in refinement depending on how small the bust is. In this carving of the old carpenter, the detail is quite lifelike. Use it as a guide *(below)*.

FINAL DETAILS

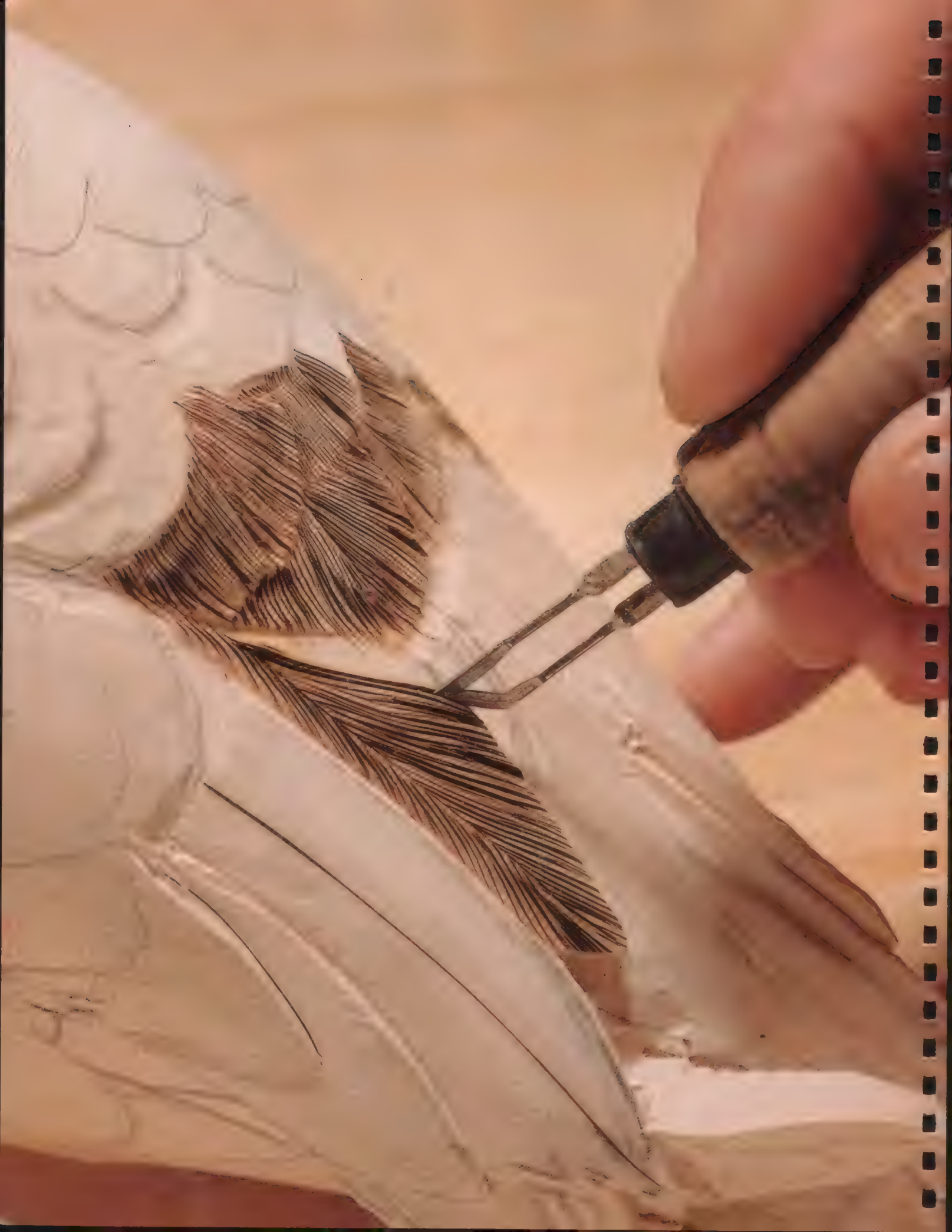
1 Adding the hair and eyebrows
To form the small curving lines that resemble strands of hair, use a 4-millimeter No. 11 gouge *(right)*. Use the same tool to form the eyebrows, curving the hairs up and to the side.



2 Undercutting the clothing
Trim beneath the suspenders *(right)*, overalls, shirt collar, and other bits of clothing with a hobby knife. You should also undercut the cap. This adds to the perception of depth and makes these items seem more realistic, and less as though they were carved from the same piece of wood as the rest of the bust.



The pounce wheel shown in the photograph at left was originally intended to mark lines such as hems when sewing. It also does double duty marking evenly stitched seams on the carving of the old carpenter.



FINISHING

Bronze powder is sprinkled on a carved picture frame with a brush. Also used for coloring incised letters, bronze powder is an inexpensive alternative to gold leaf.

For the woodworker accomplished at finishing cabinets, tables, and other flat surfaces, carvings present a special challenge. While furniture makers usually strive to incorporate a beautiful wood grain into their designs, and accentuate its figure with rich stains and radiant finishes, carvers frequently must suppress the effects of grain. In some cases, the wood's figure could distract the eye from the carver's work, turning an artistic rendering into a hopeless visual tangle. In addition, woods prized for their workability—basswood or pine, for example—absorb stains and transparent finishes unevenly. The large quantities of end grain exposed by carving only compound these difficulties.

The solution: Seal the surface, and restore control to the carver. Once sealed, even the wildest of woods submits readily to finishing that will preserve the carver's vision.

The finish selector on page 129 will help you choose the best finish for your project. Lacquer is recommended for chip carvings *(page 130)*. While it takes a bit of time to learn how to apply a light, even coat, lacquer is a simple finish that complements the carving's straightforward style. Simplicity also dictates that the low relief barnyard scene featured in chapter four be finished with a single color. While tempting to consider, a complex color scheme would detract from the carving. Instead, different areas are made darker to enhance the illusion of depth and highlight details.

Carvings in the round are treated in two ways. A simple stained finish suits the more folksy works, like the bust on page 134. Wildlife carvings, such as the duck on page 136, are meant to look as realistic as possible. While artistic painting is beyond the scope of this book, you will find some pointers on how to paint a more plainly colored figure.

Carved signs call for yet another finishing technique: gilding. Traditionally, this is done with gold leaf laid inside the incised letters. The simpler and cheaper bronze powder method is shown on pages 138-139. It is easy to see why carved signs are finished this way. The metallic gold color reflects light and attracts attention to the lettering—and the sign's message.

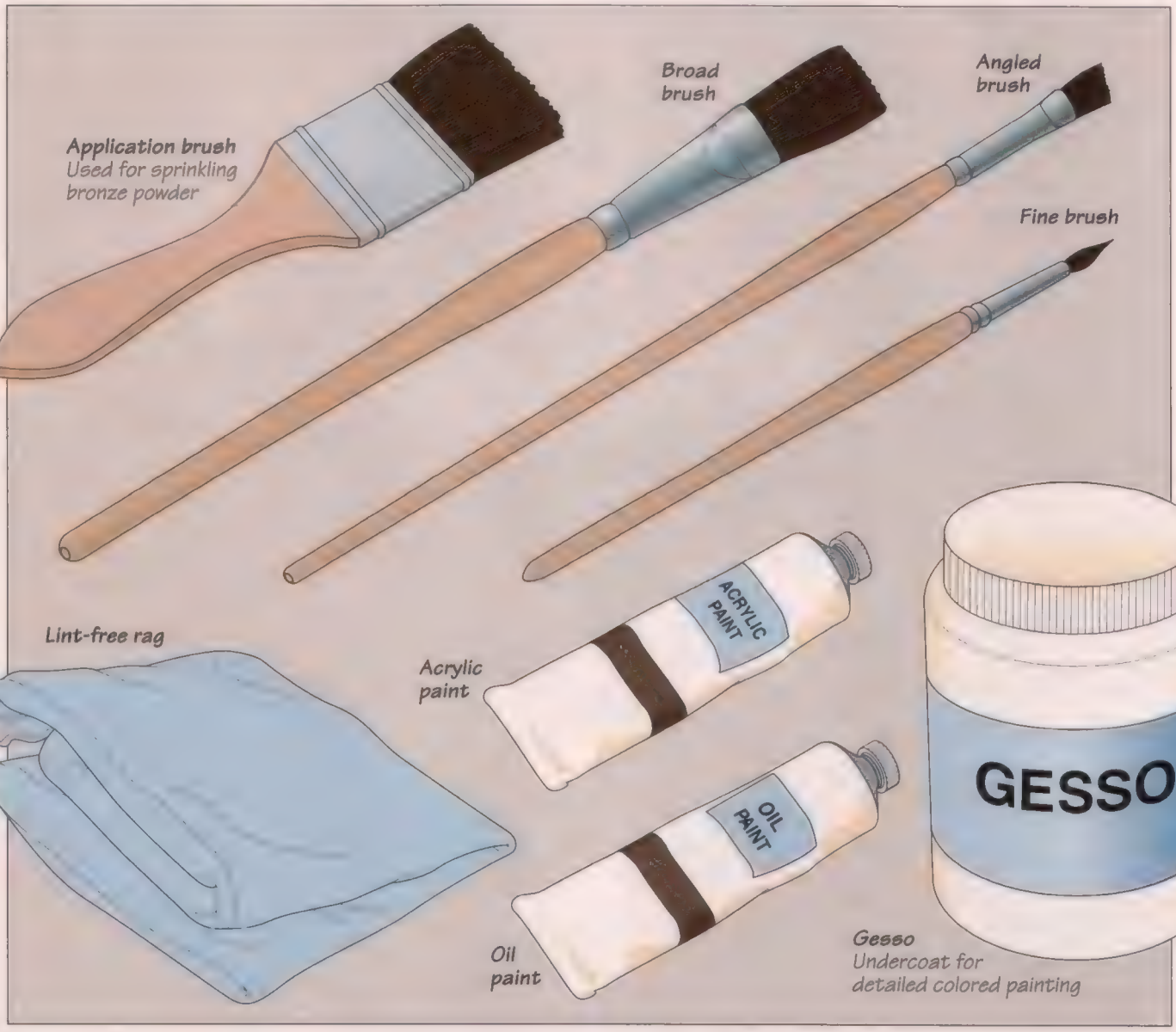
The recommended finishes are only that—recommendations. With experience you may want to try different combinations. If there is a rule it is that the carving comes first. The finish should never call attention to itself and detract from the piece itself.

Before finishing this duck, a texture is created by woodburning to simulate feathers. This step (described on page 105) *is absolutely essential, for the texture lends a lifelike appearance that the finish will simply enhance.*

FINISHING TOOLS AND ACCESSORIES

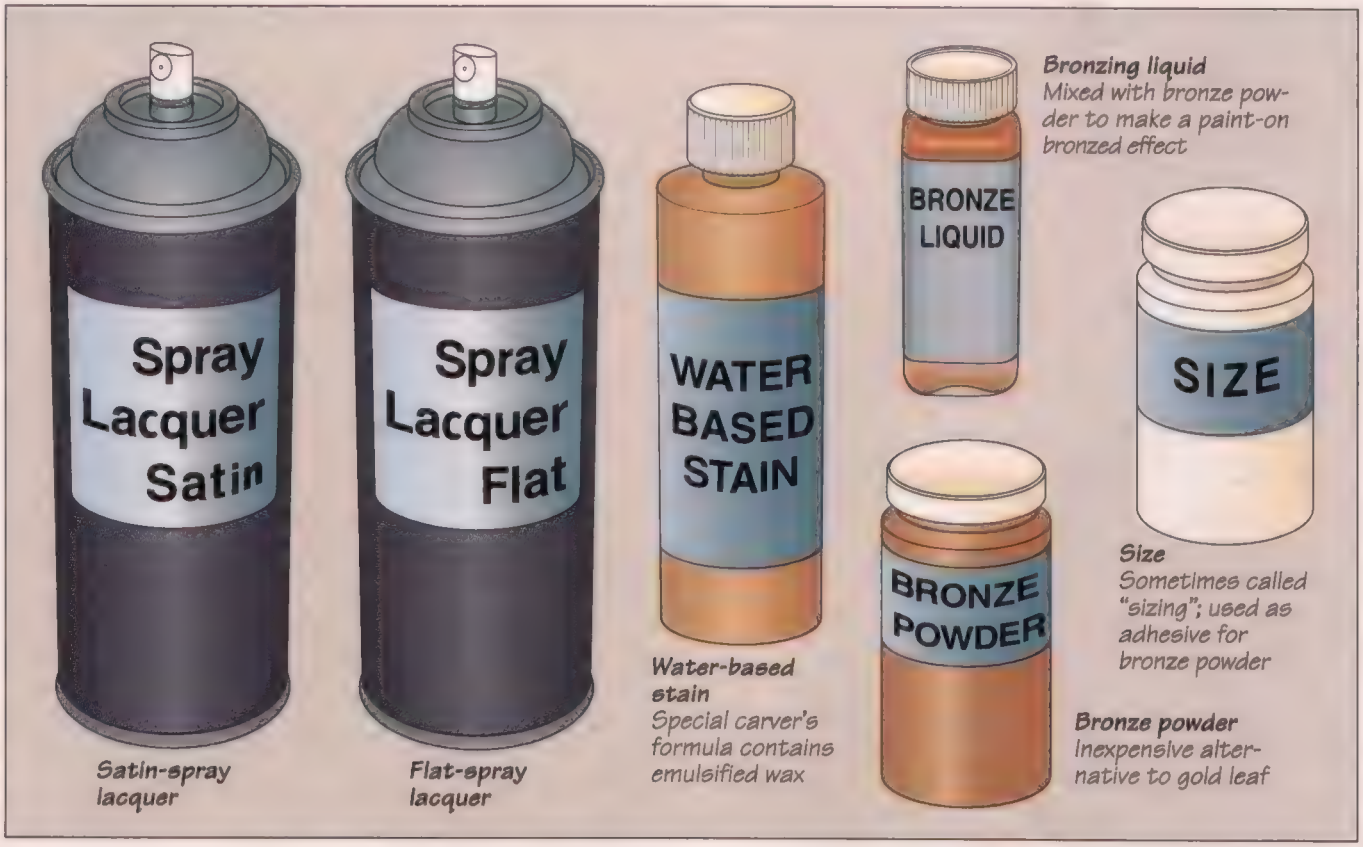
Different types of carving require different finishes. The chart on page 129 describes the most appropriate finish for each style of carving described in this book. Notice that almost all finishes call for you to seal the wood first. Sealing reduces problems caused by moisture, and allows the finisher to get much more even coloring and predictable results. Straight lacquer, lacquer/sealer, or gesso are used to seal the wood, depending on the application.

Coloring the wood is the next step. Gel stains, which contain pigments suspended in a petroleum-based gel, are excellent for coloring wood carvings. They tend to hide the grain and seal the wood, leaving a uniform color. Special water-based stains for carvers are available through wood-carving supply houses. These are formulated to leave an even color—even on end grain—and contain wax that can be buffed to a shine once the stain is dry. A single color of oil paint can be used to finish a low-relief carving, while realistic wildlife carving usually require a wide palette of acrylic paints. Also, do not forget the possibility of using no coloring at all. Some carvings, especially chip carvings, often look best finished with just a few coats of lacquer. Finally, use flat lacquer and varnish. Glossy finishes rarely work on carvings. The many angles conspire to reflect light in different directions, with unattractive results.

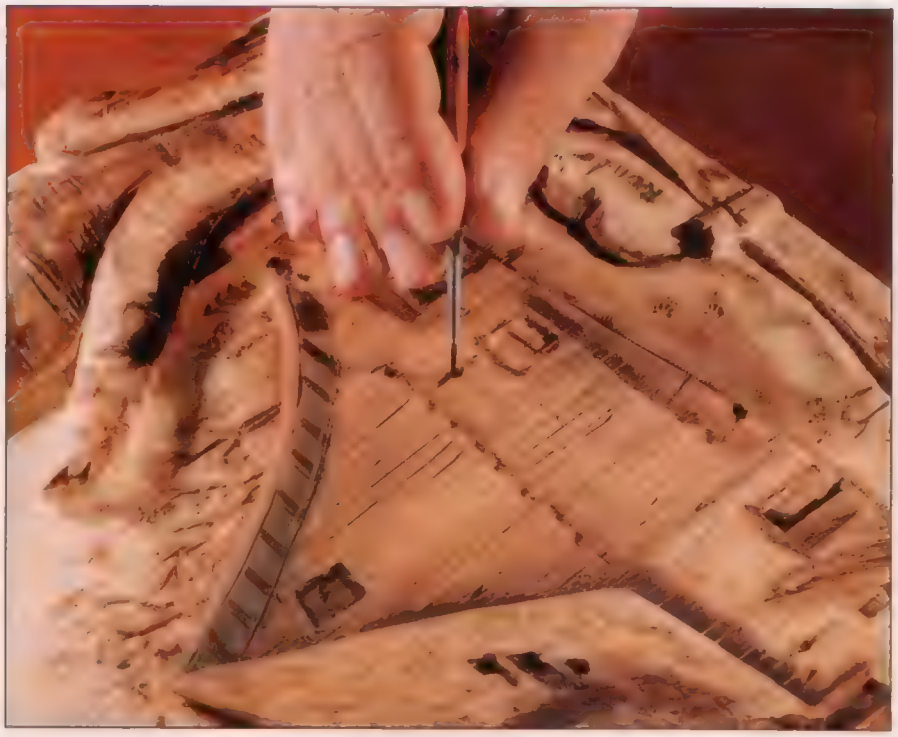


FINISH SELECTOR

TYPE OF CARVING	BEST FINISH	REMARKS	PAGE
Chip carving	Straight lacquer	Simply protects the wood.	130
Incised lettering	Gilding (applying metallic gold color)	Bronze powder sprinkled over a special adhesive is an inexpensive alternative to gold leaf; bronzing liquid gives the same effect but can be painted on; when used on signs, only the letters are gilded, the rest of the workpiece can be stained or painted.	138
Relief carving	Lacquer/sealer and oil paint	The lacquer/sealer *(see page 130, step 1)* is applied first, then the carving is colored with the paint as appropriate.	132
Shell carving	Gel stain with varnish	Shell carvings are usually stained to match the furniture to which they are applied (chairs, highboys, etc). You may use a gel stain, which hides grain on the shell, and another type on the rest of the piece. The stain is painted on lightly and the excess is rubbed off. The whole assembly can then be varnished.	134
Carving in the round	Water-based stain with emulsified wax	Special water-based stains contain wax; the finish can be buffed to a warm glow after it dries. The stain is available through wood-carving supply houses. An alternative is a gel stain.	134
Wildlife and other realistic figures	Acrylic or oil paints on gesso base	After sealing the wood with lacquer, a thin coat of gesso is applied to seal the wood further. The figure can then be painted with acrylic or oil paints.	136



APPLYING A FINISH

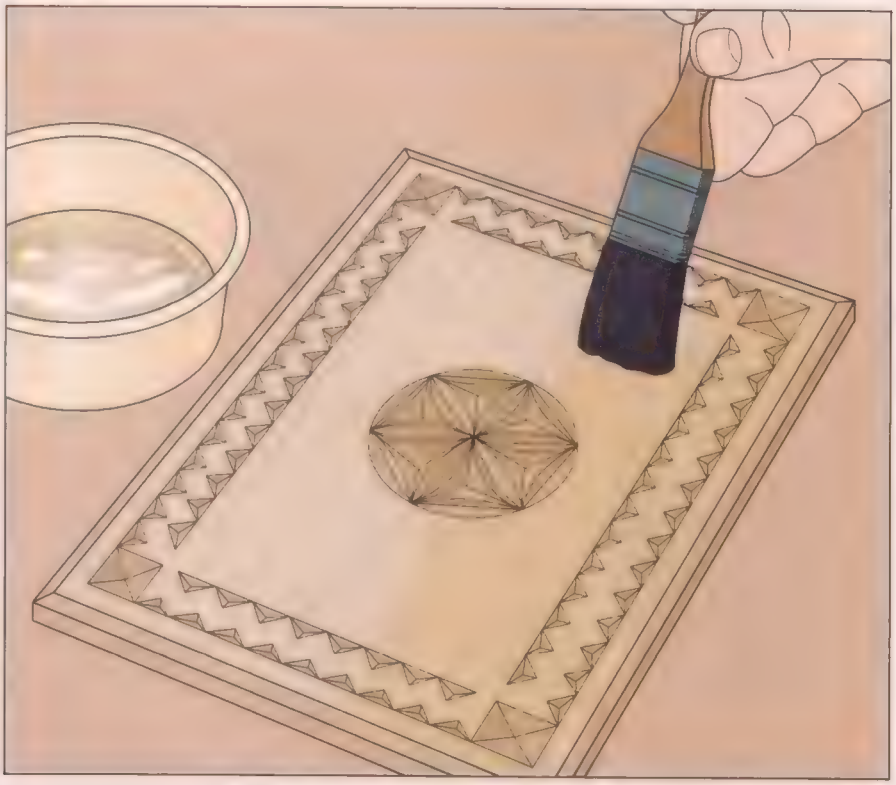


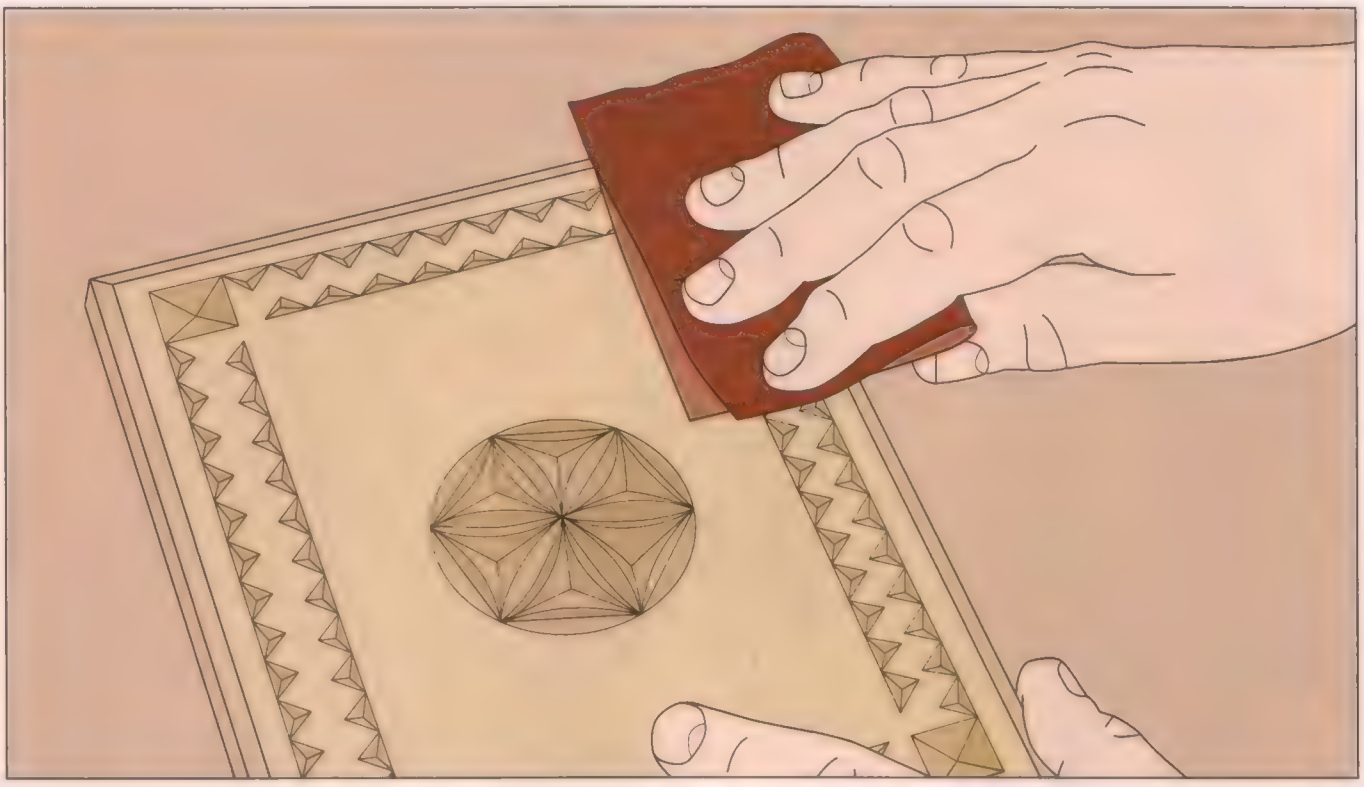
A coat of linseed oil and oil color tube paint helps emphasize the three-dimensional depth of this barnyard relief carving (see chapter four), *rendering subtle details like punched-out leaves and woodgrained barn boards more conspicuous. Painting must be done with a light touch, however, to draw attention to the carving and not the finish itself.*

A LACQUER FINISH

1 Brushing on the lacquer

Apply a coat of a lacquer. Detailed projects like the chip carving shown at right have a multitude of spots where the finish can pool. To avoid this problem, wipe off all the excess liquid from the brush each time you load it. Brush on the lacquer with the tip of the brush. Dip only the corner of the bristles into each recess, applying the lacquer with a short dab.

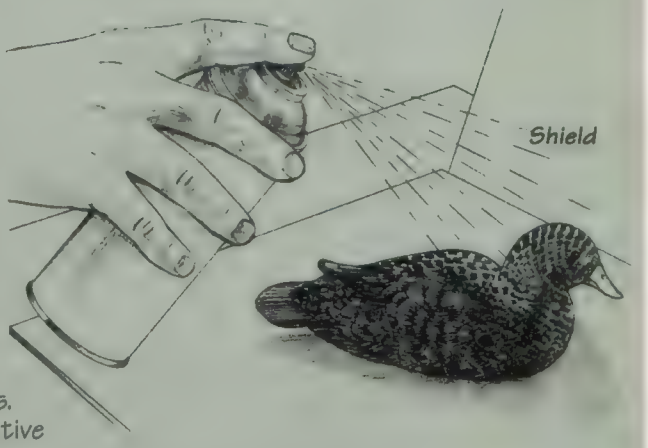




2 Sanding between coats
Sand the surface of the wood very lightly with 400-grit sandpaper after each coat *(above)*. Fold the paper into a small point to get into the tight areas and work with the grain. Then apply a second coat of lacquer.

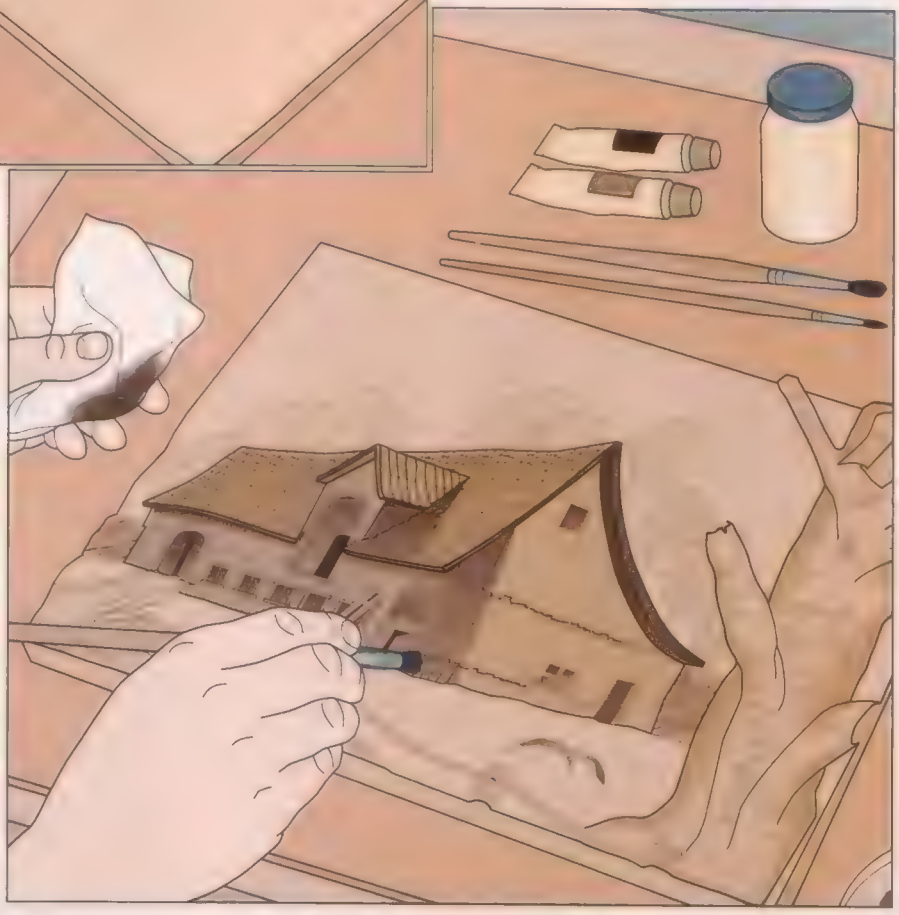
SHOP TIP

Using spray lacquer
Brush-on lacquer can leave bristle marks if you are not careful; lacquer sprayed on with a compressor and a spray gun involves expensive equipment and safety considerations. Another alternative is spray lacquer in a can. This finish is available in either satin or flat finish and produces a good-quality finish. To apply the lacquer, hold the can eight to 12 inches from the object and spray a very light, even coat. To protect your workbench, make a temporary shield out of cardboard.



AN OIL-BASED FINISH

1 Brushing on the sealer
Mix up a small quantity of sealer from 6 parts flat lacquer, 3 parts sanding sealer, and 1 part lacquer thinner and pour a bit into a shallow dish. With a 1-inch-wide paintbrush, cover the workpiece with a thin coat of the mixture *(left)*. This will give the whole object an antiqued brownish hue.

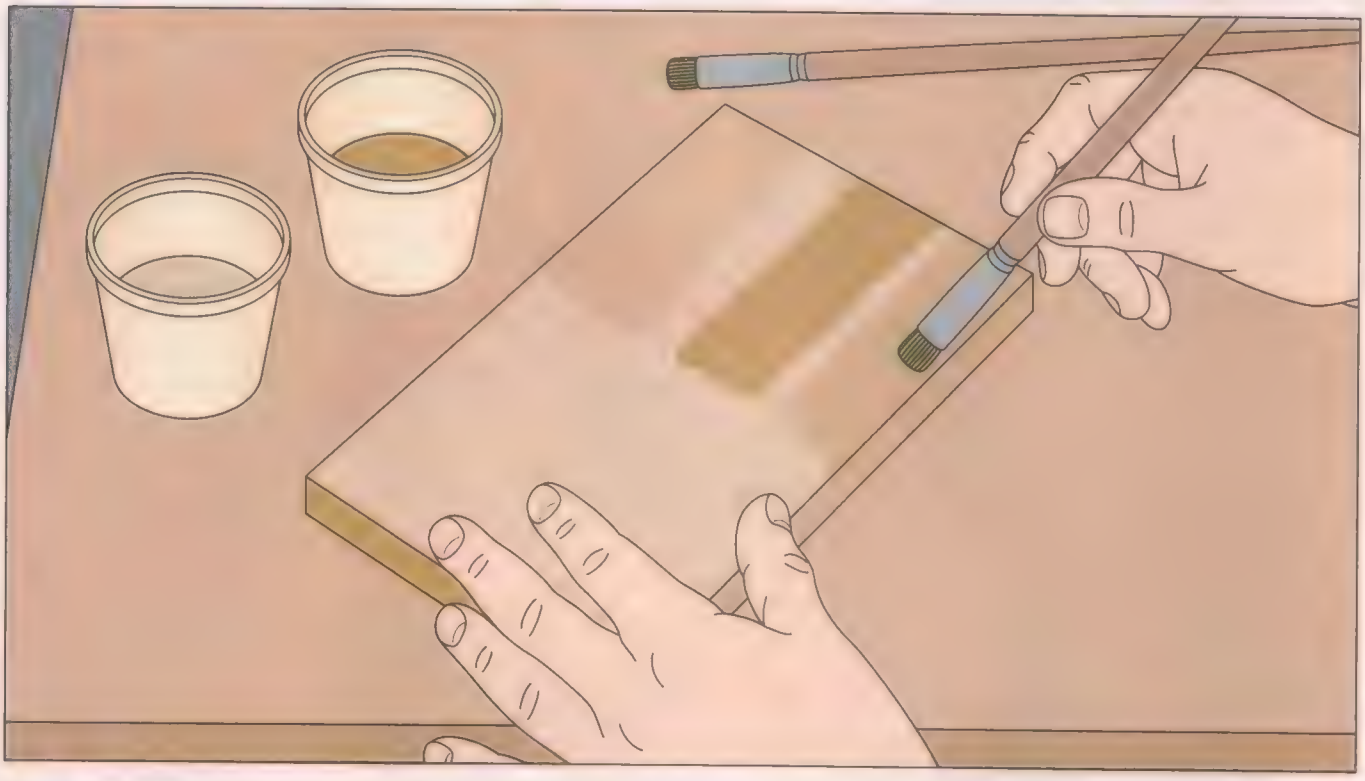


2 Painting the main subjects
Mix boiled linseed oil and the appropriate shades of artist's oil tube paints for each color. An old plastic container lid makes a good palette. Brush on the paint with a wide artist's brush *(right)*. Wipe off the paint with a rag or paper towel. The graining marks you made in the wood earlier with the scalpel or craft knife will absorb more stain and darken. To lighten the tone, rub harder. To make an area darker, rub off less paint and apply more as necessary. Also give the trees, rocks, and fence a light coat.

3 Painting the darker elements
Often certain areas must be painted in, such as the dark shadows of the open doorways in the illustration at right. Create a simple palette to allow you to blend the appropriate shades as needed—in this case, light and dark brown. Put a few drops of linseed oil on the lid occasionally to moisten your brush.

4 Adding fine details
Some of the finer details made by the punch *(page 94)* will go unnoticed unless accentuated by paint. Use a fine-tipped brush to fill in each of the punched leaves *(left)*. Also paint in the flowers and grass.

APPLYING A WATER-BASED STAIN FINISH



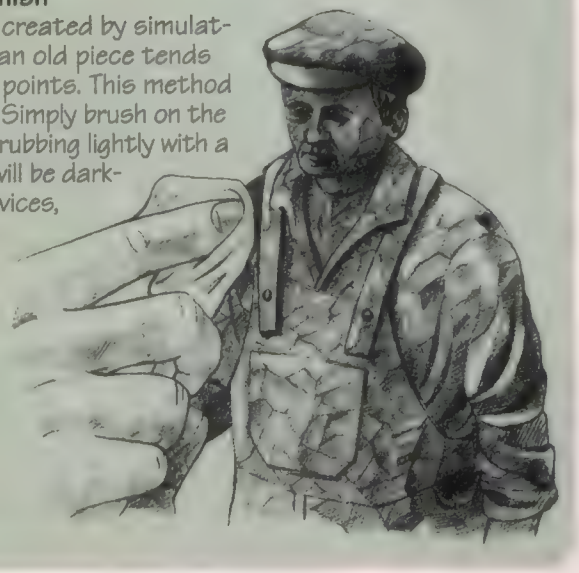
1 Mixing the paints
Blend the necessary colors to produce the right shade. Pour a bit of each color into a small vessel. Mix the two together a little at a time. Check the color by painting a bit on a scrap piece of the same stock you used for the carving *(above)*. Experiment with the colors until you find the right shade.

2 Painting the figure
Apply the stain evenly over the figure *(right)*. Since the wood is not sealed, the stain should all be absorbed readily into the wood.

3 Buffing the figure
When using a stain that contains emulsified wax *(see page 129)*, the final step is buffing. Once the stain has dried, use a soft-bristled brush to bring out the shine. Rub the brush lightly but rapidly, getting the bristles into the smallest cracks and crevices.

SHOP TIP

Creating an antique finish
An antique look can be created by simulating the way a finish of an old piece tends to wear off at the high points. This method works best with stains. Simply brush on the stain, then follow up by rubbing lightly with a lint-free rag. The stain will be darker in the cracks and crevices, but all the wood will get some effect. Since the wood gets darker the longer the stain is left on, work on one section at a time, brushing on the stain, then rubbing it off. This will prevent uneven coloring.

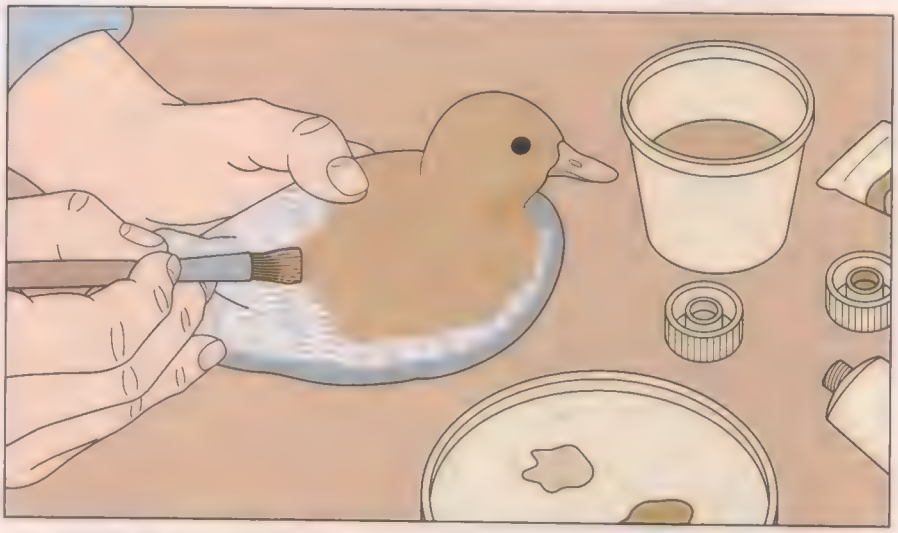


Creating the incredible realism of this red-tailed hawk demands more than skillful technique. A thorough study of the subject through photographs—or even better, live models—is necessary. This bird was carved and painted by Harold Westgate, of Endwell, New York. The illustrations at right and on page 137 demonstrate some tricks for painting a simpler decoy—a female bufflehead—with acrylic paint. While painting can add the correct color, the feathered texture must come from preliminary woodburning (see page 105). *To see what the finished decoy looks like, see page 96.*

PAINTING COLORED FIGURES

1 Applying the base coat

Seal the wood with a thin coat of lacquer. Flat lacquer from a spray can works well *(see Shop Tip, page 131)*. Next, mix up a batch of gesso, following the manufacturer's instructions. The material should be nearly clear, not opaque. Then brush on a thin coat of the gesso *(above)*. This will prepare the surface for the paint.

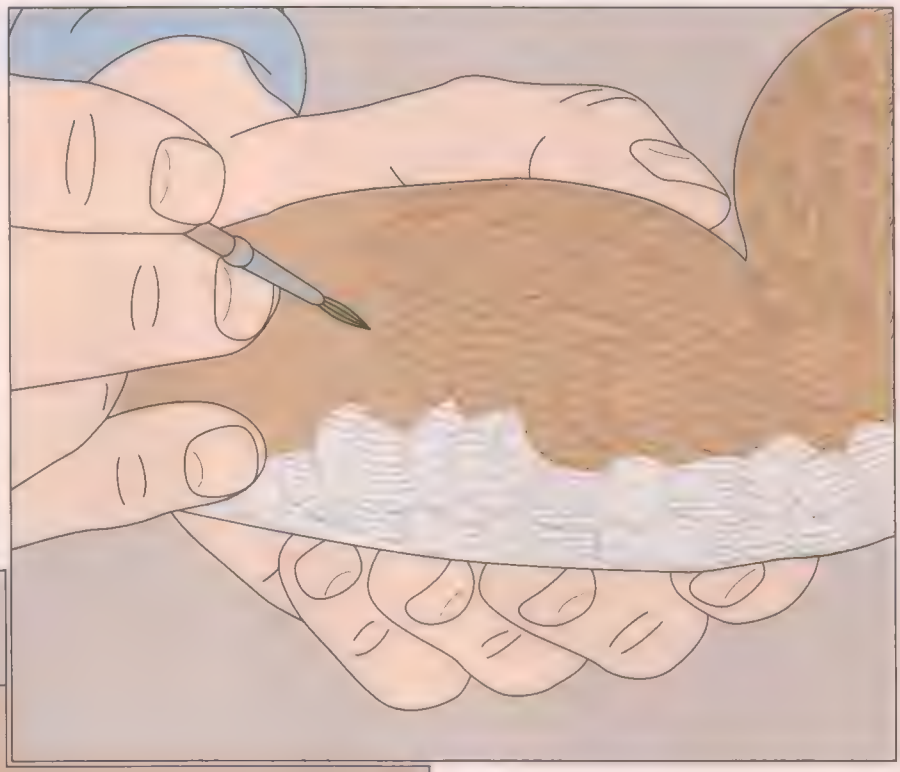


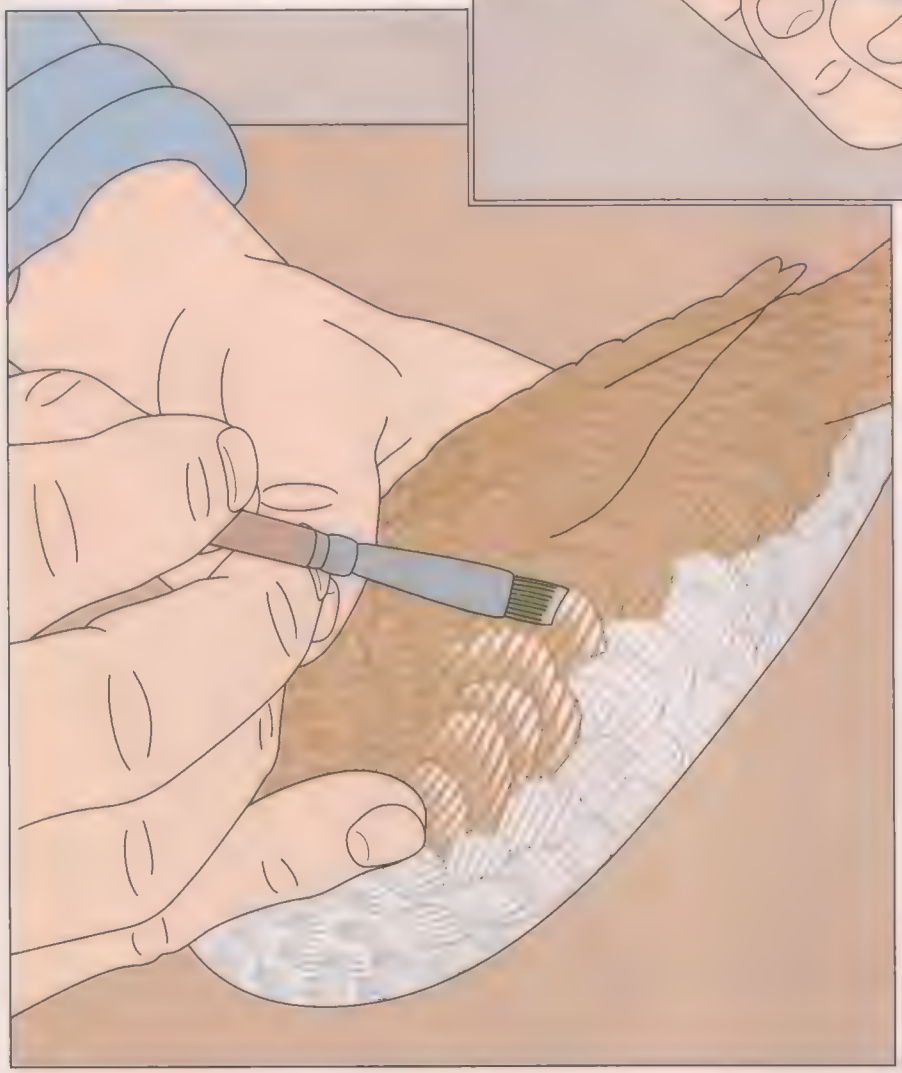
2 Applying the foundation colors

Squeeze some of the required colors onto a plastic lid to make your palette. In the case of this female bufflehead, all that is needed is brown and white. Brush the paint onto the duck with brown on top and white on the belly *(above)*. Many carvers prefer to hold small carvings in one hand while painting with the other. This makes it easier to manipulate the workpiece while you paint. Because the paint dries so fast there is usually no problem of soiling your fingers.

3 Adding fine details

Use a very fine brush to add the delicate details such as the white cheek "whiskers" and the shading of the feather tips *(right)*. Load the brush very lightly to provide maximum control. Several light applications are better than a single heavy one. Also, when possible, let the heel of your hand rest on the workpiece to help steady it.





4 Using a wide brush

Some special effects, like the outward splay of certain feathers, are best created with a wide brush. To paint the feathers, first load the brush with paint, then wipe off the excess. Set the brush down at the tip of the feathers. Press down to make the bristles spread out slightly while at the same time moving the brush away from the tip. As you pull the brush back, lighten the pressure to let the bristles come back together. It is a good idea to practice this movement on paper or scrap wood until you perfect it.

Bronze powder is an inexpensive alternative to applying gilding with gold leaf, yet it yields nearly the same result. The sign at left was first painted with a green opaque stain, then the border and letters were finished with bronze powder.

GILDING WITH BRONZE POWDER

1 Brushing on the size

The bronze powder is bonded to the wood with "size", a special water-based adhesive used for gilding. The powder will stick to the size and not the bare wood. Use a very fine brush to apply the size only where you want to gild *(above)*, then allow it to cure. Drying times vary for different brands, so check the manufacturer's instructions; some take minutes to cure, while others require up to 12 hours. Once the size is tacky it is ready for the bronze powder.

2 Applying the bronze powder
Bronze powder is applied with a special fine-bristled brush. To load the brush, simply dip it into the container of powder. A fair amount will stick to the brush through static electricity. Move the brush over the workpiece then sprinkle it onto the size by tapping the brush with your index finger *(right)*. Do not let the brush come in contact with the wood. Remove excess powder by turning the workpiece over and giving it a few taps; the excess should all fall off. Do this over a large sheet of clean paper to make it easier to recover the powder for reuse.

GILDING WITH BRONZING LIQUID

Painting on the bronzing liquid
As an alternative to bronze powder, mix up a batch of bronze paint by blending bronzing liquid and bronze powder according to the manufacturer's instructions. Use a very fine brush to apply the mixture *(left)*. When lettering, do not brush on the paint too thickly or it will tend to pool in the bottom and ruin the sharpness of the letters.

GLOSSARY

A-B-C-D

Artist's colors: Rich, colored pigments mixed in linseed oil; used to tint oil-based stains for relief carvings.

Auxiliary fence: A wooden face fixed to a tool's rip fence that serves to attach accessories and prevent accidental damage to the metal fence.

Bench hook: A lipped jig positioned against the edge of a work surface to hold chip carving blanks steady for incised work.

Bench stone: Any oilstone or waterstone used for hand-sharpening chisels and other carving tools.

Blank: A piece of solid or glued-up wood used to create a carving.

Bolster: The enlarged portion of a carving tool's blade next to the handle.

Bronze powder: Metallic, powdered pigment used as a substitute for gold leaf in gilding incised letters or architectural carvings.

Buffing: Polishing a sharpened edge to a mirror-like finish using a cloth wheel impregnated with fine abrasive.

Burr: A small ridge of metal that forms on the flat face of a tool blade during sharpening.

Carpenter's mallet: A wooden mallet with two flat, angled faces that offers more control when striking carving chisels vertically.

Carver's mallet: A cylindrical mallet with a rounded face that can be held at any angle to the work; particularly useful when working with gouges.

Carver's screw: A commercial or shop-made screw used to fasten a workpiece to a bench.

Carving in the round: The technique of carving free-standing, three-dimensional subjects that can be viewed from all sides, e.g., busts or wild-life carvings.

Chip carving: An incised carving technique in which designs are created with patterns of small, inverted pyramids cut into the wood surface.

Chisel: A flat-bladed gouge used to shape convex surfaces, remove background, and carve fine detail work.

Cross-grain cut: A cut made perpendicular to the grain direction.

Defining cut: A cut made in relief carving along the edge of a waste area to separate it from the area to be left intact.

E-F-G-H-I-J-K

Edge joining: The process of making one wide board by gluing a number of narrow boards together edge to edge.

End grain: The arrangement and direction of the wood fibers at the ends of a board.

Ferrule: A metal ring that tightens around the end of the handle of a carving tool to prevent splitting.

Foundation color: The coat of acrylic paint applied to a wildlife carving after the undercoat and before finer details are added.

Gel stain: A blend of pigments and dyes suspended in a gel that becomes liquid when stirred; ideal for wood carvings because it hides the grain and seal the wood, leaving a uniform color.

Gesso: A mixture of chalk and hide glue applied as a special undercoat to carvings before painting or gilding to help the paint bond.

Gilding: The traditional technique of applying gold leaf to carvings; artificial gold powders made from a bronze alloy can be used as a substitute.

Gimlet: A small hand auger with a tapered bit; used for pre-drilling carving blanks to accept a carver's screw.

Gouge: A carving tool with a curved sweep; struck with a mallet to shape concave surfaces.

Grain: The direction, size, and arrangement of the fibers that make up a piece of wood; specifically, the alignment of wood fibers with respect to the axis of the tree trunk.

Hold-down: Any commercial or shop-made clamp that secures carving blanks to a work surface.

Incised carving: The technique of carving an image in wood by removing the waste in intersecting angled cuts, usually between 1/8 and 1/4 inch deep.

Jig: A device for guiding a tool or holding a workpiece in position.

L-M-N-O-P-Q-R-S

Lacquer: A tough, clear, quick-drying synthetic finish available in flat or glossy finishes; the former is ideal for chip carvings.

Low relief carving: A relief carving technique that uses undercutting, texturing, and manipulation of perspective between background and foreground on a relatively flat workpiece to create the illusion of depth.

Pantograph: A commercial jig used to enlarge or reduce a carving pattern.

Paring: Slicing away thin shavings from a carving surface with a chisel.

Pounce wheel: A tailoring tool with a wheel rimmed by tiny teeth; used in carving in the round to simulate stitches.

Punch: Small, shop-made imprinting tools designed to create small textures like grass and leaves on relief carvings.

Release cut: A preliminary incision from the edge of a workpiece to a line about to be cut; allows the tool to facilitate tighter turns by removing the waste wood.

Relief carving: The technique of carving that elevates the design into prominence by removing all the surrounding wood.

Rosette: A popular ornamental chip carving design with limitless geometric variations dating back to pre-Christian Europe.

Roughing in: In carving in the round, creating broad details on a subject that will later be refined with finer carving tools.

Roughing out: The initial stage in carving in the round where the basic shape is established by carving away the waste.

Serif: The small decorative tails, flourishes, or hooks at the ends of letters in certain typefaces.

Side pocket: In wildlife carving, the bulge created by the rib cage of a bird.

Size: A special adhesive for bonding gold leaf and bronze powder to wood; also known as sizing.

Spokeshave: A hand tool with an adjustable cutter for shaping curved surfaces.

Stop cut: In incised carving, a cut made to free one edge of a waste piece that will be removed by a subsequent intersecting cut.

Strop: A strip of leather dressed with a fine abrasive to polish the cutting edges of gouges, chisels, and other carving tools.

Surgical knife: A knife with a blade made from very high quality steel that cuts and sharpens better than a standard hobby knife.

Sweep: The curvature or angle of the cutting edge of a chisel.

T-U-V-W-X-Y-Z

Tang: The portion of a chisel's blade fixed inside the handle.

Tearout: The tendency of a blade or cutter to tear wood fibers.

Template: A pattern used to guide a tool in reproducing identical copies of a piece.

Tenon: A protrusion from the end of a workpiece that fits into a mortise.

Tung oil: A natural, water-resistant drying oil derived from the seeds of the tung tree; available in pure, modified, and polymerized forms.

Undercutting: Trimming away a small quantity of waste from beneath the edge of a raised detail, thus defining the detail and adding depth to the carving.

V-Tool: A chisel with a V-shaped sweep; useful for carving deep lines and corners.

Veiner: A gouge with an extreme, U-shaped sweep.

Volute: An S-shaped scroll whose radius tightens toward its ends; found in acanthus leaves and shell designs popular in Queen Anne and Regency furniture styles.

Waste: Wood carved away from the desired form.

Wood burning: A finishing process that imparts both color and texture to wildlife carvings by charring the wood with an electric tool.

Wood movement: The shrinking or swelling of wood in reaction to changes in relative humidity.

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ACKNOWLEDGMENTS

The editors wish to thank the following:

CARVING TOOLS
Delta International Machinery/Porter-Cable, Guelph, Ont.; Diamond Machinery Technology Inc., Marlborough, MA; Garrett Wade Company, New York, NY; Great Neck Saw Mfrs. Inc. (Buck Bros. Division), Millbury, MA; Lee Valley Tools, Ltd., Ottawa, Ont.; Stanley Tools, Division of the Stanley Works, New Britain, CT; Woodcraft Supply Corp., Parkersburg, WV

GETTING STARTED
Adjustable Clamp Co., Chicago, IL; Great Neck Saw Mfrs. Inc. (Buck Bros. Division), Millbury, MA; Lee Valley Tools, Ltd., Ottawa, Ont.

INCISED CARVING
Adjustable Clamp Co., Chicago, IL; American Tool Cos., Lincoln, NE; Wayne Barton, Park Ridge, IL; Record Tools, Inc., Pickering, Ont.

RELIEF CARVING
Adjustable Clamp Co., Chicago, IL; Great Neck Saw Mfrs. Inc. (Buck Bros. Division), Millbury, MA; Stanley Tools, Division of the Stanley Works, New Britain, CT; Tool Trend Ltd., Concord, Ont.

CARVING IN THE ROUND
Adjustable Clamp Co., Chicago, IL; Delta International Machinery/Porter-Cable, Guelph, Ont.; Great Neck Saw Mfrs. Inc. (Buck Bros. Division), Millbury, MA

FINISHING
Les Decorateurs de Montreal Ltée, Montreal, Que.; Olde Mill Cabinet Shoppe, York, PA; Harold Westgate, Endwell, NY

The following persons also assisted in the preparation of this book:

Lorraine Doré, Alan Flegg, Ed Gallenstein, Martin Jones, Giles Miller-Mead, Ron Sheetz, Pauline Van Sertima

PICTURE CREDITS

Cover Robert Chartier
6,7 Andy Goodwin
8,9 Ed Homonylo/Mammoth
10,11 Mark Kelley
49 Courtesy Alpine School of Woodcarving
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